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Abstracts of Papers at the

International Rubber Congress

By Georges Genin

THE International Rubber Congress, organized by the French Rubber Syndicate, in collaboration with the French Association of Rubber Engineers and the Union of Planters of Indo-China, on the occasion of the International Exposition currently being held in Paris, has met and achieved an absolutely unprecedented measure of success both with respect to the number of those participating in the Congress from all the nations that took part in it, and on account of the interesting nature of the papers presented to it.

More than 300 French, German, English, Belgian, American, Italian, Dutch, Danish, Norwegian, Roumanian, Czechoslovakian, Spanish, Swiss, Polish and other participants responded to the call of the Organizing Committee, and all the working sessions as well as the social gatherings for bringing the members of the Congress in closer touch with each other were attended with great interest. The technical papers were divided into three groups, the following principal questions having been placed on the agenda of the Congress:

1. Properties and applications of latex.
2. Properties and applications of rubber. (Constituents and preparation of mixtures).
3. Synthetic rubber and chemical derivatives of rubber.

The working sessions were held in the morning at the Hall d'Iena, at the doors of the Exposition, and in the afternoon at the Hall of the Studio of the Champs-Elysees, in the very heart of Paris. We propose to give first a report on the papers presented in

EDITOR'S NOTE: The International Rubber Congress, held in Paris, France, on June 28-30, was one of the most important meetings of rubber chemists and technologists ever held. Many of the world's leading rubber experts presented papers. Included were papers by Dr. W. B. Wiegand of the Columbian Carbon Company and H. Walter Grote of the United Carbon Company. In all there were more than 40 papers given. Recognizing the importance of the Congress, THE RUBBER AGE commissioned Georges Genin, internationally-known rubber technologist, to act as its special correspondent. Mr. Genin sat in on every session of the Congress and, after listening to each paper and the discussion, prepared abstracts for our readers. These were written in French. The first group of abstracts (all of which are published herewith, together with a brief description of the Congress) was placed on the *S. S. Deutschland* which left France on July 2. They were received in our offices on Saturday, July 10, and were quickly translated by J. Kottgen, and are presented herewith. The balance of the abstracts will appear in our next issue.

the course of the working sessions. Unfortunately, in view of the number of these papers, which were often very interesting, the time allotted to each speaker had to be greatly curtailed and the discussion eliminated in most cases.

Properties and Applications of Latex

Study of the Formation of Rubber in the Plant, by OTTO AMBROS (Germany).

Whatever the part played by latex in hevea (the various opinions about this are rather divergent) it seems to be established to-day that in the course of the synthesis of rubber in the plant, isoprene appears to be an intermediate product. The question therefore arises how rubber is formed from this isoprene. The author advanced the hypothesis that the natural polymerization of isoprene in the cells of the plant is started and accelerated by an oxidation caused by a system of enzymes. The investigations he carried on in a tropical laboratory in Sumatra have shown that the serum of latex has an accelerating effect on the polymerization of isoprene emulsions in water to which oxygenated water had been added. This effect is nullified if the reaction of the enzymes is stopped by an acid or a poison such as hydrocyanic acid.

History of Latex, by LEO ECK (Germany).

In his paper, the author simply expounded the first investigations and oldest and not very well known publications in which latex is mentioned. Then he pointed to the investigations of Arnold Juliaano in 1780 (Dissertatis Chemica de Resina Elastica Cajeniveusi), who had found nitrogen compounds (volatile ammonia) in the distillation products of rubber; to those of Fourcroy, Carrodori (comparative researches concerning the native milky saps and the milky saps of rubber), and of Gehlen.

Fire Protection in the Rubber Industries, by JEAN MOUNDLIC (France).

The author studied the problem of the protection against fire in the rubber industries, considering the matter from two entirely different points of view: the fireproofing of the manufactured products, and protection against fire in the factories.

First of all he reviewed the substances that can be added to rubber to make it fireproof: mineral additions such as silica, alumina, magnesium carbonate, ammonium metal phosphates, ammonium bromide and urea, these latter substances releasing extinguishing gases. However, these additions may reduce the qualities of the mixtures, and they are also often replaced by organic substances which, when raised to a high temperature, release gases exerting a strong extinguishing effect: chlorinated naphthalene, hexachloroethane, etc.

As to fire protection in factories, particular attention has been paid to the problem of reducing the danger from fire by using non-inflammable solvents, the principal ones of which are the chlorinated solvents: carbon tetrachloride, trichloroethylene and dichloroethylene. Latterly other non-inflammable solvents have appeared on the market having the very valuable property of giving much less viscous solutions than those obtained with the chlorinated solvents which have been named. The author gave the characteristics of these solvents manufactured by I. G. Farben-industrie and by the Compagnie Pechiney, and the properties of the solutions obtained with them.

Other precautions may also be taken in the factories to avoid the dangers of conflagration; these consist substantially in using for the construction of tools metals that will not give sparks. The most important metals possessing this property are the glucinum bronzes that are manufactured in Europe to-day, which have a Brinnell hardness of 400 and a tensile strength which, after the metal has been worked, may attain 135 kg. per cm.^{2}.

Rapid Estimation of the Value of a Liquid Latex, by ADOLPHE BLONDEL (France).

The author of this communication is of the opinion that in order to obtain rapid indications as to the value of a latex, it is preferable to determine its density rather than measure its dry extract. According to the averages secured over a period of years he established that latex containing 39.56 to 44.10% of rubber has a density of 0.980 to 0.970; when it contains 53.74 to 55.36% of rubber, its density varies between 0.957 and 0.955; finally, when it contains 60 to 62% of rubber, its density varies between 0.951 and 0.944. This latex may be estimated also according to the Stormer viscosimeter, but in that case the information obtained is much less exact, for latices of closely similar concentration may possess clearly distinct viscosities.

Difficulty of Deep Impregnation of Textiles with Latex, by JEAN BONGRAND (France).

The author succeeded in deeply impregnating textiles with latex, but the threads worked on had to consist of slubbings that had been slightly twisted and from which the waxes and gums had been eliminated by means of a suitable boiling or degumming operation. To make impregnation possible, it is moreover necessary to regulate the pH of the fibers and of the latex. The fibers have an acid pH; latex has an alkaline pH. To prevent coagulation, the pH has to be adjusted to the same value, either by acting on one or the other, or on both. Moreover, it is to be regretted that *Funtumia latex* is not used on a larger scale, for it has the property of being stable in an acid medium. Finally, to facilitate impregnation, the action of vacuum and pressure is made use of, the fabrics impregnated with latex undergo a ripening process that extends the contact between the latex and the fiber, remedies dripping, and insures a better adherence of the rubber particles to the fibers.

Transmission and Conveying Belts Obtained by Weaving Textiles Deeply Impregnated with Latex, by JEAN BONGRAND (France).

The author studied the characteristics of belts obtained by weaving threads previously impregnated to the core with rubber by means of latex (Filastic belts). These belts have a resistance to rupture of 500 kg. per cm.^{2}, thus greater than that of leather belts; they exhibit a very great flexibility and great adherence; they are not permanently stretched and are yet elastic. As the fibers are completely protected, these belts are insensitive to the action of humidity, water vapor, acid vapors, sulfuric acid of 10%, caustic soda, oils, etc.

In the course of the discussion following this paper, Mr. Bongrand pointed out that his process enables him to impregnate to the core the fibers of rayon without any difficulty.

Production and Preparation of Latex, by ANDRE BOURBON (France).

Mr. Bourbon gave a brief historical account of latex, its essential qualities, the first tests made for the purpose of utilizing it commercially, and the importance of the modern processes of utilizing latex. He also offered some observations on the transportation of this product and the precautions to be observed in manipulating it.

Practical Investigation Concerning the Use of a Mixture of Accelerators for the Rapid Vulcanization of Latex, by C. FALCONER FLINT and W. J. S. NAUNTON (England).

The authors investigated the use of a mixture of diethyldithiocarbamate of diethyl ammonium and of isopropylxanthate of sodium for the vulcanization of latex. They established that this mixture is very active if used for a dry and hot vulcanization. It does not thicken the latex compound, and gives a vulcanized product the physical properties of which are satisfactory. With this mixture, it is not necessary to make the latex undergo a previous ripening, unless a very rapid vulcanization is desired. If for any reason it is necessary to stock the latex already containing accelerators, prevulcanization need not be feared in the liquid state if the latex remains ammoniacal. However, this combination is not recommended for vulcanization of ammoniacal latex in the liquid state.

Stabilization of Latex, by JACQUES O'MARCHAL (France).

Ferments play a very important part in the coagulation

of latex; in order to insure the stabilization of this substance it is therefore natural that it should have been proposed to paralyze these ferments without a chemical precipitation capable of modifying the structure of latex profoundly. This result can be attained simply by utilizing the property of zeolites or permutites to exchange by simple contact the metals that catalyze the ferments: calcium, magnesium, iron, manganese; for alkaline metals: sodium, potassium, etc.

The stabilization treatment of latex thus comprises the following operations: classification by the centrifugation of the latex in order to eliminate dust and impurities, interchange of the salts in order to paralyze the ferments, and addition of a very light antiseptic for the destruction of the microbes.

The latex received in Europe often has a gray color owing to the iron in the containers; it is sufficient to add a little alkaline ferrocyanide or ferrocyanide amine in order to obtain a considerable deposit of Prussian blue which can be eliminated by means of centrifugation; there then remains a very white latex. This process also offers the advantage of eliminating the copper salts.

Latex in the Fabric Rubberizing Industry, by FRITZ MICHL (Austria).

The author presented a historical account of the rubberizing of fabrics, pointing out the difficulties that arose at the beginning of this new application of latex. He then expounded the expedients that have been proposed to avoid these difficulties and insure a better impregnation of the fibers with latex: treatment of fabrics, addition of wetting medium to the latex, use of vacuum and pressure, etc. He indicated the principal applications of fabrics rubberized with latex, and showed the advantages of this process over that based on the use of rubber solutions in volatile solvents.

Some Properties of Latex, by PAUL STAMBERGER and ERNST SCHMIDT (Austria).

It is possible to free commercial ammoniacal latex of the greater part of the constituents of the serum it contains by treating it in the following manner: by cataphoresis, the particles of rubber contained in the latex are precipitated on an anode; the rubber paste is then dispersed in a 1% ammonia solution, and treatment by cataphoresis is repeated with this dispersion until a product has been obtained that is practically free from the serum.

Certain properties of this purified latex were then determined. In the first place its specific weight as a function of the rubber concentration enabled one to find by extrapolation the specific weight of 0.905 for dispersed rubber. Viscosity was then studied by means of a Hoppler viscosimeter, and it was established that at equal concentration the viscosity of the purified substance is notably less than that of the unpurified substance. The reason is that the solvatized layer absorbed on the particles of rubber is eliminated by purification, and the volume of the dispersed phase is diminished with relation to the volume of the agent of dispersion.

Synthetic Rubber and Chemical Derivatives of Rubber

Application of Auxiliary Products for the Natural Rubber Industry to the Artificial Rubber Industry, by R. THIOLLET (France).

Having referred to the characteristics of the various artificial rubbers obtained from ethylene (Igenite, Koroseal, Thiokol, Perduren and A.X.F.) and of those obtained from acetylene (Neoprene and Buna), the author surveyed the various auxiliary products that are normally used in the rubber industry and may also be used in connection with artificial rubber. He discussed the use of carbon blacks, barium sulfate, organic dyes, accelerators and anti-oxidants and stated that the artificial rubbers offer new outlets for the auxiliary products: the organic colors make it possible to color them in fine shades and carbon black considerably improves their mechanical properties. It is interesting to note that certain of these products behave sometimes as anti-oxidants or stabilizers, and sometimes as accelerators or plasticizers, according to how they are used in natural rubber or in artificial rubbers.

Neoprene in Mixtures Resistant to Oils and Combustion, by FERNAND JACOBS (France).

The author investigated how it was possible, by the addition of certain substances, to enhance still further the properties of Neoprene to resist mineral oil and fire so as to enable the mixture to meet the specifications of certain organizations, especially the French railroads. In order to estimate the resistance to oil, the test pieces were plunged into oil in motion for a period of 6 hours at 70° F., and the increase in weight and the elongation at rupture were then determined. To estimate resistance to fire the electric furnace or the flame of a Bunsen burner was used. These experiments established that the addition of chalk (calcined magnesium) will produce mixtures resistant to fire and to oil and still capable of being colored. On the contrary, the attempts made to deodorize Neoprene by the addition of perfume, attempts which are usually successful with natural rubber, did not furnish good results.

The use of Factice in Mixtures with a Neoprene Base, by JOHN H. CARRINGTON (England).

In the preparation of mixtures with a Neoprene base, factice constitutes one of the most important additions. In particular, brown factice is extremely useful, for it can be employed in greater proportion than in mixtures with a natural rubber base, without reducing the elasticity of the product. The author examined the resistance of mixtures containing variable proportions of white factice or brown factice, vulcanized either in live steam or in talc, to swelling in oil.

He established that the samples vulcanized in steam have more resistance to mineral oil than those vulcanized under the press; the reverse takes place as regards resistance to lithographic varnishes. Factice was then utilized, in the preparation of which a certain proportion of non-saponifiable oil was used; the presence of these oils in the factice increases the resistance of the mixture to the oil that has been utilized in the preparation of the factice.

Neoprene, by Mr. and Mrs. G. DUMONTHIER and PETER OVTENHOFF (France).

After giving a brief review of the manufacture of Neoprene and its principal properties, the authors described its present applications in the following industries: petroleum, oil and fatty substances; electrical (cable making); aeronautical (making of rubberized fabrics); printing; etc. This paper was accompanied by numerous slides showing various applications, especially in the United States.

The Difficulties Encountered in the Preparation of Synthetic Rubber Resistant to Oil, by T. L. GARNER and J. G. ROBINSON (England).

The authors studied mixtures containing Neoprene only, Perduren only, or both Perduren and Neoprene, as well as mixtures with a Thiokol D base, from the point of view of their resistance to oil and molding characteristics. Operating at a temperature of 180° F. in lubricating oil (Castrol XL, Essolube 40 and D. T. D. 44B), they found in most cases a swelling and in certain cases a contraction. Some of the samples exhibited a hardening or a superficial disintegration. The quality of the oil exerts an important influence on the result, and the oil with the greatest swelling capacity is the one that is prepared from naphthalene petroleum. From the point of view of molding, only the mixture with a Neoprene base has shown itself to be absolutely satisfactory. Certain of the others might be used for molding simple pieces concerning which no deformation is to be feared when removed from the mold in the hot state.

Azotized Colors Derived from Rubber, by RODOLFO LOW (Spain).

Rubber bromide and the chloro-rubbers react with aniline and the other aromatic amines in the presence of ferric chloride as catalyst. In this manner substances of rather undefined composition are obtained, composed largely of diamino-diphenylhydrorubber or homologues. These

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Production Capacity of Reclaimed Rubber Plants

Potential Domestic Annual Supply, with Plants Operating at 80% of Capacity, Amounts to Considerably More than the Demand

By E. G. Holt

Acting Chief, Leather and Rubber Division,
Bureau of Foreign and Domestic Commerce

EDITOR'S NOTE: The following data on the potential capacity of reclaimed rubber production in the United States is taken from a special report made by the author in his capacity as Acting Chief of the Leather and Rubber Division, Bureau of Foreign and Domestic Commerce, and is based on an extensive survey of the field. Because of the importance of the report to the users of reclaimed rubber in this country it is being published in full. It clearly shows that the production capacity of the reclaimers is well above estimated consumption figures for the next several years.

FIRMS understood to be engaged in the production of reclaimed rubber were circularized by the Leather and Rubber Division recently with a questionnaire asking for reports, based on plant operations during 24 hours a day and six days a week, on their potential annual capacity as of October 1, 1936, and June 1, 1937, and (allowing for planned extensions) on January 1, 1938. Under "reclaimed rubber," directions called for inclusion of all grades of reclaim, hard rubber dust, and shoddy, but not factory scrap reground by the same company.

Replies were received from 28 companies operating 33 reclaiming establishments, and reporting a potential annual capacity for production of 203,600 long tons as of October 1, 1936; 220,600 long tons as of June 1, 1937; and 253,900 long tons as of January 1, 1938. Replies were also received from several firms who reported no reclaiming facilities, while a very few firms know as producers failed to report. It is estimated that the reported statistics were at least 97 per cent complete for the industry.

Of the firms reporting capacity, 13 with a combined annual capacity of 56,560 long tons reported the same annual production capacity for each of the three dates. With few exceptions these firms were rubber manufacturers who reclaim principally for their own use. These firms accounted for 27.5 per cent of the reported October, 1936, capacity, and 22.1 per cent of the January, 1938, capacity.

A group consisting of the eight leading firms accounted for over 85 per cent of the total reported capacity on each date (over 86 per cent for January, 1938).

Monthly Capacity on Various Dates

The monthly capacity as of October 1, 1936, amounted to 16,967 tons on the basis of reported figures, or raising this from the estimated 97 per cent to the full 100 per cent, the total industry capacity was then 17,492 tons. The production reported by the Rubber Manufacturers Association for September, 1936, was 12,959 long tons (estimated by the Association as 100 per cent), signifying operations then at only 74.1 per cent of capacity.

The 100 per cent monthly capacity calculated in the same way for June 1, 1937, would be 18,952 long tons. The highest monthly production recently reported by the Rubber Manufacturers Association, Inc., was 15,938 long tons for December, 1936, and 15,793 tons for May, 1937, strikes having at times affected production of some part of the industry in interim months. The following table shows that these figures represented a much higher rate of operation for the industry in May than last September:

	Production During Month (tons)	*Capacity End of Month (tons)*	*Operating Rate (per cent)*
Sept., 1936	12,959	17,492	74.1
May, 1937	15,793	18,952	83.3

During May the industry was operating at a rate approaching practical capacity, judging from information received, and it therefore appears that practical capacity is somewhat lower than the potential capacity reported under the instructions in our questionnaire. This is particularly true, probably, in the case of the numerous firms which produce reclaimed rubber for their own use but not for sale to other manufacturers.

Potential Capacity for 1938

The monthly capacity on January 1, 1938, similarly raised to the estimated 100 per cent, would be 21,813 long tons, or an annual capacity of 261,753 long tons. This would be sufficient, at say 80 per cent of capacity, to provide 33 per cent as much reclaim as of crude during 1938, if the United States consumption of crude rubber for that year should amount to 635,000 long tons. This figure is stated merely as an example of a possibility, not as an indication of probable consumption.

During the first five months of 1937, the percentage relation of reclaim to crude rubber consumption in the United States has been running between 26 per cent and 28.4 per cent. It needs to be borne in mind that the statistics compiled in this survey represent *potential* capacity, and that long-sustained operations at a rate much above 80 per cent would be somewhat unusual. It should however be noted that reclaimers might operate on a seven-day week basis and thus have a somewhat higher potential capacity than that reported under the instructions in our questionnaire.

The Rubber Manufacturers Association, Inc., re-

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Eliminating Accidents Through Motion and Time Study

Designed Primarily as a Means of Reducing Labor Cost, Motion Study Is also Important in Reducing Accidents

By William R. Mullee
Industrial Engineering Department, American Hard Rubber Co.

AT the Safety Convention last Fall I stated that motion study and safety were partners. Since then a number of insurance company engineers have written to me confirming my statement. They illustrate a wide field, from mushroom growing to making bed springs; from shearing wool to making furniture. Almost as wide a field as the walrus covered in "Alice in Wonderland" when he "spoke of many things; of ships and shoes and sealing wax; of cabbages and kings." Let's take the principles of motion economy one by one and see why they are so universally linked with safety. To begin with the motion study engineer says, "Avoid holding."

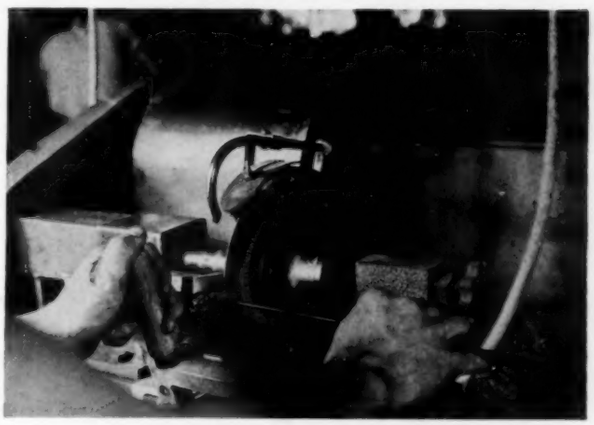
Avoid Holding

I am convinced that of all causes of industrial accidents "holding" is safety's "public enemy No. 1." When a motion study engineer has to demonstrate his ability to make a quick saving, he usually picks out an operation where the human hand is used as a holding device. Such jobs show 10 to 30% saving, depending on the amount of holding time. By coincidence, holding is a fault the safety man should also look for to demonstrate his ability to improve working conditions. Holding is not only poor motion practice but also amples:

A sawyer feeds the lumber to a buzz saw. Working close to the saw, his fingers slip and he loses one of them. Good motion practice would suggest the use of a push block for short or narrow stock, instead of using the hand as a holding device.

A drill press operator holds the piece fast to the table with the left hand and brings down the drill with the right hand. Half way through, the drill binds and whirls the piece around causing a nasty finger injury. Introduce good motion practice using a fixed jig or vise to clamp the work. The jig not only frees the left hand to move pieces but improves safety. In many cases it is possible to feed two jigs, one with each hand, using some form of hold-down to keep the pieces in place in the jig during the drilling operation. Labor savings are often 30% and a safer job. Holding cotton waste or rags in the hand to brush drillings away from the work is another way to cause a finger injury. Why not connect air to the jig and blow away chips while drilling?

An iron worker wields a sledge hammer while his helper holds the chisel. A false blow and the helper goes to the First Aid Room. Now substitute a chisel holder instead of the human hand as a holding device and you have improved safety.



The holding fixture on this machine holds the stock close to the cutting wheel thus improving production and providing safety.

In the handling of acids or inflammable materials, injuries sometimes follow tilting the acid carboy by hand. Safety men know that acid carboys should be held in an approved cradle rocker before attempting to pour acid from them. A holding device improves safety. Many injuries are caused by screwdrivers, chisels and other cutting tools, when the operator holds a portable object by hand instead of placing it in a vise.

A motion study of an operation on a grinding lathe showed that 10% of the time was lost extracting the piece from the chuck. A glance at the operator's hands showed where knuckles met grinding wheel while unchucking. A clawlike mechanical hand was attached to the turret relieving the hands as a holding device. The job was safer and 10% faster. Both the operator and the company gain from such practical application of safety through motion study. To both motion study engineer and safety man, the human hand is the poorest holding device.

Unnecessary Motions

Frank Gilbreth, father of motion study, once said, "There is no waste in the whole world that equals that of needless, ill-directed and ineffective motions and the resulting fatigue." Mr. Gilbreth referred primarily to waste in the form of time and effort. I am convinced that it also applies to waste in the form of human misery due to accidents. Needless motions are of great importance to the safety man. Many safety guards

Note: This paper was presented at the 8th Annual Convention of the Greater New York Safety Council, held in New York City, on April 13-15, 1937.

are installed with the fond hope of eliminating accidents. Some time later a check-up shows that some of these guards have either been taken off or rendered inoperative. Other guards are in good shape and in daily use.

Now what is the reason for this condition? Carefully check the operator's motion path and you will usually find that the guards that remain on the job are those which do not interfere with the operator's motion path. The operator removes guards which cause needless, ill-directed and ineffective motions. For example, a gate guard on a small stapling machine was frequently found to be disconnected. A motion analysis revealed that this guard made the operator work in an awkward position and interfered with his production. The guard was redesigned. A transparent celluloid cage was placed around the die, leaving just space enough underneath to slide in the pieces. The celluloid permitted clear vision while the gate obstructed the vision. The celluloid guard did not interfere with the operator's motion path. Production increased 15%.

In one plant a number of operators buffed large hard rubber sheets between double buffs. The operator held the sheets at one end in a horizontal position and worked them in and out of the buffs. To prevent injuries should the operator's hand be pulled into the double buff, the management provided safety belts. These belts buckled around the man's waist and were chained to a pillar about three feet behind the operator. This arrangement promised to confine injuries to hand abrasions rather than body injuries. Several times during the day the operators unbuckled the belts to shift piles of work or to talk to inspectors, attending to personal needs, etc. If they had a small lot of work, buckling and unbuckling the safety straps looked like needless motions, particularly if the foreman was not looking. They became careless. One day, a sticky buff took hold of a rubber sheet and pulled in the operator's hand, arm and face.

This gruesome accident might have been avoided if the safety man understood the worker's attitude towards needless motions. Some time later a motion-minded operator suggested a fixed guard in the form of a pair of rollers mounted in front of the buff. This required no "Get Ready" or "Clean Up" like putting on or taking off the safety belt. The operator was no longer chained to his job and both the operator and the safety man felt happy. The lesson learned was—"Introduce unnecessary motions and you invite trouble."

Motion Path

Of utmost importance in analyzing a job is a study of the motion path traced by an operator's both hands. One day the safety man went upstairs to take a picture of the new buff guard. To his great surprise this new buff guard was missing. Questioning brought out the fact that the operators found the new guard interfered with their motion path and they, therefore, contrived to remove it. All learners used the guard for the first few months until they became skilled enough to avoid buff accidents. After that, the guard was removed and the operator worked without it. Analyzing the situation once more, it was evident that one management error was overcome only to blunder into another. A motion picture was taken of the operator's movements while using the buff and it was found that the guard interfered on the down stroke. Experiments were made by opening up the rollers to overcome this condition until a point was reached at which the rollers did not interfere with the operator's motion path but still kept his hands out of the buffs. Several operators tried out the guard once more and expressed complete satisfaction.

Normal Work Area

Motions should be confined to the normal work area for the greatest production with minimum fatigue. From the safety man's viewpoint this means less danger of entangling fingers in belts, gears, etc. They are usually outside the normal work area. When dangerous conditions exist within the normal work area one remedy is to move the normal work area away from the source of danger. For example: many accidents occur on machines like leather embossing presses. The press helper is usually charged with the job of straightening out the leather and taking the curls out of it. The press is controlled by the embosser and where it is necessary to straighten the leather the helper frequently signals the embosser to stop the press. Trouble occurs when the helper becomes overconfident in the embosser and he anticipates his stopping the press.

Once in a long time the embosser misses. Every embosser's helper has been told not to put his fingers in the press and to use a stick. In our opinion the only effective way to tell the embosser's helper to use a stick is to put a wide table on the helper's side of the press so that he cannot reach in and do his work effectively by hand. In other words, you locate the dangerous situation beyond the normal work area.

The so-called "dial feeds" used on punch presses and other machines enable the operator to load the dial away from the danger zone. Conveyor or belt feeds also locate the normal work area at a safe distance. When an accident happens the operator's hands will instinctively move along a habitual motion path. If he can reach the safety controls quickly the severity of the injuries are minimized. Take, for example, the safety devices on rubber mills, calenders, etc. Let me read what an insurance company engineer has to say about them. This man visits hundreds of mill rooms annually:

> "I am wondering if the people who draw up some of the codes designed for the prevention of accidents have ever given any thought to motion study work. The safety code for rubber mills prescribes that the safety trip rod shall be not more than 69" above the working floor and shall have 3" adjustment up and down. The illustration seems to indicate that the mean height of the bar shall be 69" and the bar shall be set somewhere between 66" and 72" from the floor. Here is a bar that is to be grabbed by a man caught in a mill, who has a split second to act in, and who is presumably highly excited. There is nothing in the code about the relative height of the man and the height of the bar. Knowing nothing about motion study work, I am still sure that no *process* would be devised by a motion study man, including such an awkward motion as grabbing a rubber mill stop, nor would a man be expected to operate a calender stop on a wide calender by means of a cable at the end."

Some of you will agree with this engineer's statement and others will not. I don't care to open a controversy on this subject; I merely want to point out that insurance companies recognize the importance of locating safety controls within the normal work area and along the operator's habitual motion path. Machine manufacturers who are motion conscious provide central lubrication systems within the normal work area or even automatic lubrication. No longer must the man with an oil can get tangled up in moving belting or machinery. Gear shifts, control lev-

ers and push buttons are arranged conveniently and safely. Designing for motion economy normally means designing for safety.

Get Ready and Clean Up

All jobs may be broken down into three parts: the "Get Ready," the "Do" and the "Clean Up." Much of the savings made through motion study is by a reduction in the "Get Ready" or "Clean Up." When these two items are at a minimum, production is at a maximum. Instinctively many operators are aware of this situation and apply the idea subconsciously. The safety man should also keep this in mind.

We frequently advise grinding operators—"Wear goggles and protect your eyes." A few days later we walk through the Grinding Department and find that the operator has hidden away the goggles to avoid the nuisance of putting them on and taking them off. Then something flies off the grinding wheel and he is all ready for the First Aid Hospital. Motion study engineers would call putting on the goggles a "Get Ready" and taking them off a "Clean Up." Common sense would suggest fixed guards like a safety glass plate fastened to the machine requiring no "Get Ready" nor "Clean Up." Such guards really work. The safety man at our Butler plant has a very interesting exhibit on his desk. It is a safety glass plate with a thin abrasive wheel driven half way through by centrifugal force. One look at this exhibit is better than a thousand words.

Gravity Feed Hoppers

When a motion analysis of a job shows a long "transport" element to bring the piece to the point of use, the engineer recommends gravity feed hoppers with delivery chutes. By shortening or eliminating the transport a labor saving is accomplished. Few people realize that this also improves safety. Let me quote from a recent article in *National Safety News*:

> "I cannot think of safeguarding without recalling August Kaems whose name is linked for all time with the development of power press safety. There can be no more impressive monument to his memory than the record of the hands and fingers that have worked unmaimed because of his practical genius.
>
> "One department of his company operated 700 presses. Previously, 36 fingers had been lost in one year. Following the installation of the gravity and chute feeds designed by August Kaems four years passed without the loss of a single finger. And production on the presses increased from 15% to as much as 150%."

Provide Ejectors

To eliminate the grasp and transport elements involved in removing a finished piece from a die or holding fixture the motion study engineer tries to provide ejectors. These ejectors may be foot-operated or machine-operated. Jigs and fixtures are often tapped for air injection. At one plant all punching of hard rubber pieces from sheet has been changed to hollow dies, whereby the pieces are ejected through the top of the die, which not only saves a few motions but keeps the operator's fingers out of the die.

In another case the operator had to wear a rubber finger to prevent injuries when cutting rods and tubes with an abrasive wheel. This was particularly true of very short pieces which the operator had to eject from between the wheel and the stop. Recognizing this as poor motion practice, one of the foremen arranged a holding fixture with several holes through which stock was fed. The fixture holds the piece during the cut and the pieces were ejected down a drop delivery chute into the tote box. Injuries were eliminated and labor saved.

The double buff guard seen here does not interfere with the operator's motion path nor introduce unnecessary motions.

Pick up and place takes exactly twice as long as slide, therefore, the engineer uses the "slide" principle where possible. The progressive feed of strip stock on a punch press is a good example of sliding. It is not necessary to compare the safety of this method with that of pick up and place piece in die.

Usually where individual pieces are transported by the slide method it is possible to provide fixed guards with an opening just large enough to slide pieces under. When sliding, remember the fingers encircle the piece bringing them in direct line of the cutting tool. Sliding is better safety practice as well as better motion practice.

Drop Delivery

The motion study engineer frequently talks about a "drop delivery." This means t release the piece at point of use instead of carrying it aside to the tote box. Labor savings of 5 to 10% are common. Safety is improved because the eyes do not leave the work place. One hand is sometimes injured while the eyes follow the other to the tote box. Again, 25.9% of all accidents are due to handling and drop delivery eliminates handling. A chute in one plant was provided to carry used molds down two floors to the melting pots, saving most handling. Lift truck skids are drop delivered to the floor level saving rehandling.

In conclusion, motion study, designed primarily as a means of reducing labor cost, is also an important factor in the reduction of accident cost. The "One Best Way" must be the safe way.

Non-Adhesive Rubber Surfaces

MANY rubber products have the disadvantage of being adhesive to the skin. The Magyar Ruggyantaarugyar, leading Hungarian rubber manufacturer, has perfected a process for overcoming this disadvantage. The process includes a method by which the surface of rubber articles can be covered with a felt-like fibrous material by treating them with an aqueous latex dispersion which contains powdered plant fibers, silk or cotton waste, rubber sponge grains, etc. To obtain rubber articles permeable to air, a foamy layer is produced on these surfaces. Sudden heating bursts the bubbles and instead of the usual spongy mass, a loose, air-permeable material is formed which can be vulcanized by the usual methods.

Coaxial Cable Insulation

THE electrical and mechanical requirements of the coaxial cable unit recently installed between New York and Philadelphia as an experimental installation by the Western Electric Company differed so radically from conducting structures commonly used for telephone transmission that changes were required in practically all previous design and manufacturing practices, according to the June, 1937, issue of the *Bell Laboratories Record*. It was found that harder material than the dead soft copper ordinarily used for cable conductors was required in order to give sufficient tensile strength for installation and to allow the rubber-disc insulators selected to be snapped on by machine.

Machine for snapping insulating discs of hard rubber over the inner conductor of the coaxial cable at ¾-inch lengths.

The insulation between the center wire and the outer shell of the coaxial unit is in the form of slotted discs of rubber that are applied to the wire from the side. A special hard rubber compound was developed by the Chemical Research Laboratories of the Bell Telephone Company for this purpose. When heated to a moderate temperature, this rubber is soft enough to allow the discs to be punched from a 1/16-inch sheet, and when cold is sufficiently elastic to permit the discs to be snapped over the wire without cracking and sufficiently rigid to support the central conductor. The width of the slot at its intersection with the central hole is made somewhat smaller than the diameter of the conductor itself so that the discs must be forced over the wire and grip it firmly. As mentioned, they are snapped into position by machine.

The completed coaxial unit is only about a third of an inch in diameter. Nine copper tapes, which form the outer conductor, are only a sixth of an inch wide and a fiftieth of an inch thick at the central or thickest part. Thirteen-gauge wire is employed for the central conductor and the rubber insulators are spaced at three-quarter-inch intervals. Two coaxial units and two quads of nineteen-gauge wire are stranded together, wrapped with two thicknesses of paper, and then sheathed with lead to form a completed coaxial cable.

Some difficulty was experienced in drying this special cable. From all appearances part of the moisture from the paper of the quads was deposited on the rubber discs. To remove this moisture, a drying cycle was devised which subjected the unsheathed core alternately to dry air and vacuum in a vacuum drying oven. Because the hard rubber insulators in the coaxial cable are affected adversely by heat, special precautions had to be taken.

Both the intensity of the heat and the time of exposure are important factors, and to reduce them to a minimum the lead press was not recharged during the covering of a section of the land cable, since the stopping of the press while recharging would expose the rubber discs to excessive heating. Lengths up to approximately 1,500 feet could be run on a single charge. To reduce the exposure to heat still further, the cable was passed through a bath of cold water as it left the lead press.

For two sections of cable which were to be armored for crossing rivers the length and sheath thicknesses required more lead than could be extruded in a single charge period in the lead press. For these two sections special insulating discs of a material less affected by heat were employed in the part of the cable that was in the press during recharging, although these discs are less efficient electrically than the rubber-disc insulators.

Production of Reclaimed Rubber

(Continued from page 238)

porting the monthly production of reclaimed rubber, estimates their statistics to be 100 per cent complete. The total production so reported for 1936 was 150,571 long tons. This we find did not include reports from firms which accounted for 4.86 per cent of the somewhat incomplete production capacity reported to us as of October 1, 1936. It was nevertheless well above the production estimated in the Department of Commerce survey of rubber consumption for 1936, where after allowing for reported consumption, exports, and inventory changes, the production was estimated at only 142,000 long tons. We mention these facts as relevant and perhaps worth consideration by those who use the data contained in this report.

The quarterly reports issued by the Rubber Manufacturers Association, Inc., also contain less complete statistics on production of reclaimed rubber, and their completeness percentage is estimated by the R. M. A. by comparison with their estimated 100 per cent monthly statistics on the same subject. We find these quarterly statistics did not include reports from firms which accounted for 23.87 per cent of the production capacity reported to us as of October 1, 1936; the R. M. A. production statistics for the four quarters accounted for 79.5 per cent of the total reported by them for the twelve months.

Red Book Closing Date Extended

The date for closing advertising forms on the 1937 RUBBER RED BOOK Directory has been extended to July 30. Prospective advertisers are urged to have their copy in prior to that date.

INSTRUMENTATION in the Rubber Industry*

By Reginald Trautschold, M.E.

Cam-Governed Controllers

The cam-governed type of automatic controller, by which the time-relation of each operation to those of the other operations during the curing cycle is precisely synchronized and coordinated, is applicable both to conditions where the various steps involved are performed in a given sequence and stopped in the reverse order and to conditions where the starting and stopping of the operations overlap and one or another repeated. In one case, single-cam controllers driven by small synchronous motors are used and in the other multi-cam instruments are required.

In the case of a single-cam cycle controller operating four pilot valves in sequence, for example, a press can be closed and locked; steam or other heating medium supplied during the cure and cut-off at some predetermined time; and the press can then be opened automatically and unloaded. The single-cam is cut to control the necessary operations in respect to their proper durations and these intervals of time are, furthermore, subject to adjustment and modification as desired by the simple substitution of suitable cam segments.

In a variable-cure single-cam type of automatic controller, one or several valve operations may be conducted in sequence and brought to a stop in reverse order in a similar manner, with a two-speed cam-operated mechanism. The change in speed of cam rotation is secured without shifting gears through a mechanical arrangement which reverses the direction of the controller motor drive. Operated with controlling cam segments, as in the case of the simpler constant speed controls, the timing cam rotates at low speed during the period of cure and then returns at fast speed to the stop and reset position. A momentary pressure of the starter button is then only necessary to repeat the cure cycle.

Where the automatic repetition of operations is involved, or for the starting and stopping of several operations at intervals which may overlap, a constant-speed syncronous motor drives a cam shaft on which are secured concentric cams at set intervals. These cams, with their adjustable segments (by which the various pilot valves are manipulated as required) are so arranged that each cam has a separate rider actuating its own particular pilot valve control.

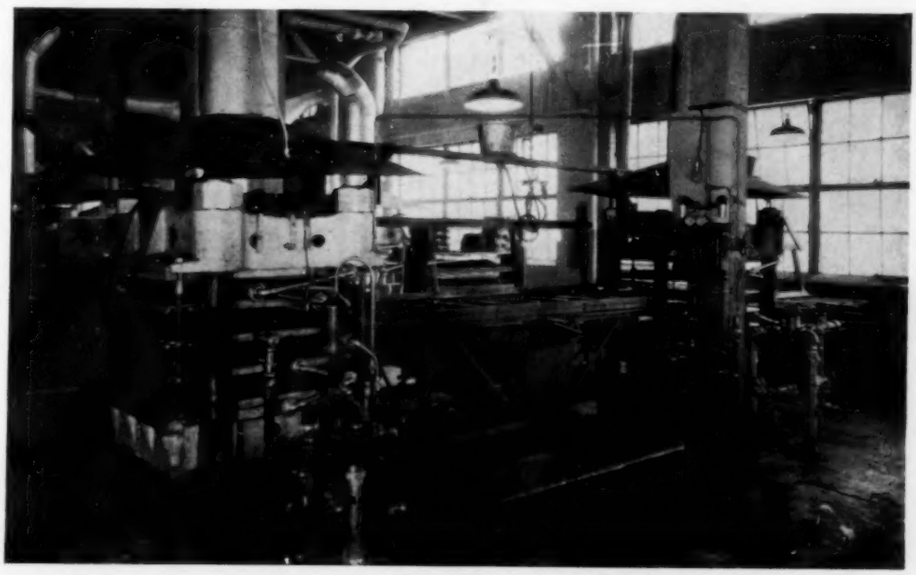
Splicing Machine Control

These cam-governed controllers have been applied to marked advantage to tube-splicing machines, as well as to all varieties of curing presses, etc., and a brief description of how they function in this exacting splicing service well illustrates the important part played by modern instrumentation in present day tube production.

The endless soft tube as it advances from the die opening of the tubing machine and is carried along a conveyor to the tube splicing machine is subjected to a series of standardized operations preliminary to the actual splicing. The long tube is reenforced, valve stems are cemented; it is cut into proper lengths, holes are burned for the valve stem opening—all before the tubes are ready for splicing.

The splicing machine then grips the ends of the

* Concluded from THE RUBBER AGE, June, 1937, pp. 167-170.



A platen press in an Eastern rubber factory equipped with an electric-clock time cycle controller. When the controller returns to the starting setting the press opens and on unloading is ready for another curing cycle.

(Photo, courtesy of the Taylor Instrument Companies)

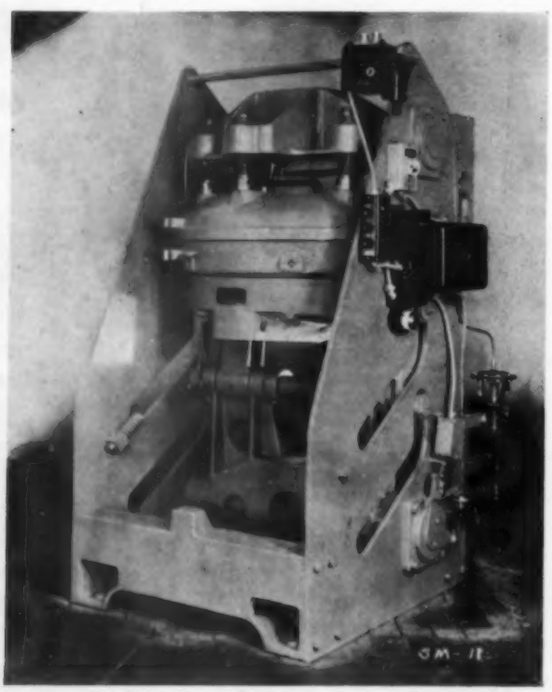
tube to be closed, trims them with an electrically-heated and thermostatically-controlled knife, and holds the ends of the tube firmly while the weld is effected. These several operations are now being performed automatically by a four-cam time-cycle controller, the pilot valves of which admit and exhaust the air from operating cylinders in accordance with a definite, predetermined and closely timed sequence. The complete cycle is consummated in a matter of seconds—about 15 for a passenger car tube to about 45 seconds for a heavy truck tube—and, since the timing is brought down to split-seconds, the satisfactory operation of the machine is quite beyond the limits of manual control.

Variable-speed process controllers are also especially well suited to the press operations and automatic control of the cure of the spliced tubes. The machine operator, after inserting the tube in the press, has simply to push the starter button, whereupon the steam-heated press closes and a limit switch starts the cycle controller motor driving the governing cam. A valve in the air line connected to the tube inside the mold opens and inflates the tube.

At the expiration of the cure time, which starts with the closing of the heated mold, the control cam closes the air valve and allows the tube to deflate. When the air has escaped, an electric contact through a switch again starts the press motor and opens the mold. Simultaneously, the controller motor rotates at high speed, bringing the cam rider promptly to the reset position. The vulcanized tube is then removed, cooled and dispatched to the inspection room.

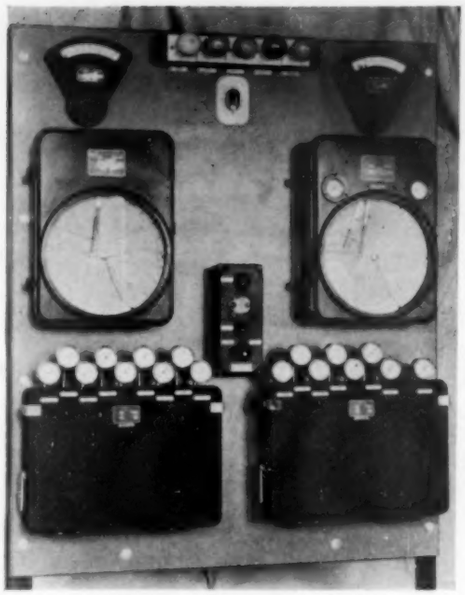
Vulcanizing Casings

Sensitive, automatic regulation over the curing of tire-casings is likewise secured with the aid of these cam-governed controllers. The flat, built-up, reinforced and beaded band taken from the tire drum is forced and "sucked" into the tire mold and about the heavy hot-water forming bag and after taking shape is ready for the cure. In the "pot heater" type of vulcanizer, the shaped tire, with the water-bag still inside, is placed in one-half of the mold containing the tire trend die. The other half mold is then put in place, the assembly closed under pressure and the molds stacked, usually about twenty at a time, in the pot heater and the water-bags connected to a common line.



Courtesy, The Bristol Co.

Electric tube press with variable, cam-governed controller. The complete cycle is made in a matter of from 15 to 45 seconds.



Courtesy, The Bristol Co.

Equipment for full automatic control of the "pot heater" type of vulcanizer popular in many rubber factories.

The combination of applied ram pressure and the force exerted simultaneously by the hot water pumped under pressure into the respective water bags squeezes the rubber into the mold tread and heats up the inside of the tire. The vulcanizing process then automatically commences, governed by a complement of precision instruments—an indicating electrically-operated temperature controller, a two-pen air-operated temperature-recorder-controller, an indicating electric pressure controller for the hydraulic ram and a master multiple-cam cycle controller with two operating motors. The procedure is essentially as follows:

On starting the cure, one of the cycle-controller motors opens a valve in the steam line to the heater, placing the admission of steam under control of the two-pen air-operated recorder-instrument, one bulb of which is located in the heater and the other in the condensate chamber. When the proper heat balance is attained, the first cycle-controller motor stops and the second starts up for the duration of the cure and then stops. The first motor then resumes activity and provides a steam blow-off, followed by a water spray and drain opening for condensate escape. The electric control for the ram pressure thereupon functions, relieving the pressure first from the water bags and then from the hydraulic press. The removal of the molds, after disconnecting the hot water line and draining the bags, follows. The molds are then opened and the vulcanized, treaded tire casing appears.

Much the same functions are performed by the variable-cure, cam-governed controllers in the operation of individual tire presses, as outlined for curing tubes, the automatic control operating with relays and limit switches. In some of these presses, the master cam-operated controllers regulate press closing, provide a steam blowdown, control the cure, blowdown again, exhaust and open the press. In other cases,

multiple-cam cycle controllers are employed, aside from the regular press operatings, for condensate drainage control, supplementing in this service the use of steam traps.

At one factory, one cam of a four-cam cycle controller is utilized to manipulate four valves, each on a different press, to control the condensate discharge from sixteen presses, the cam holding the valves open for 15 seconds during each 10-minute cure for the escape of accumulated condensate.

Vulcanizing Chamber Control

The curing of many rubber articles, other than tires and tubes, is consummated in heated tanks or chambers, however, and in this broader field marked advance has also been made in instrumentation. Each heater is now quite generally provided with recording and indicating pressure gauges and thermometers for ascertaining heats at strategic points. Steam pressures during the cure are registered, temperatures posted continuously upon slowly rotating charts, and further refinements in the way of automatic control are plentiful.

In some heater chambers, the temperature is held constant by control instruments responding to even trivial changes in temperature within the heater enclosure. In others, in more exacting time-temperature controls, the cure cycle is maintained by automatically varying the admission of steam in accordance with a definite, predetermined heating schedule, by means of control cams revolving on spring-wound or electric-clock mechanisms. These cams are cut and proportioned to conform to a carefully predetermined cure cycle, as standardized upon for a given product and required results, and at the end of the cure close the valve in the steam line, exhaust the heater, admit cooling water and finally open the door for the removal of the cured articles.

With this type of vulcanizer, the most satisfactory system of automatic control is probably that obtained by means of a multiple-cam cycle controller making use of two complete temperature control hookups, with one detecting bulb in the vulcanizer and the other in the condensate chamber, the latter being set to operate at some definite lower temperature. The first of the controller cams admits steam to the vulcanizer, the flow of which is sensitively regulated by an air-operated temperature controller having its bulb in the heater.

At the completion of this predetermined heat-controlled cure, as set by the adjustable segments on the cam, the steam valve closes automatically and the exhaust is opened and closed after a set interval by a second control cam. A third cam then comes into play to cool the vulcanizer with a cold water spray and a fourth cam opens the heater exhaust drain and completes the curing cycle.

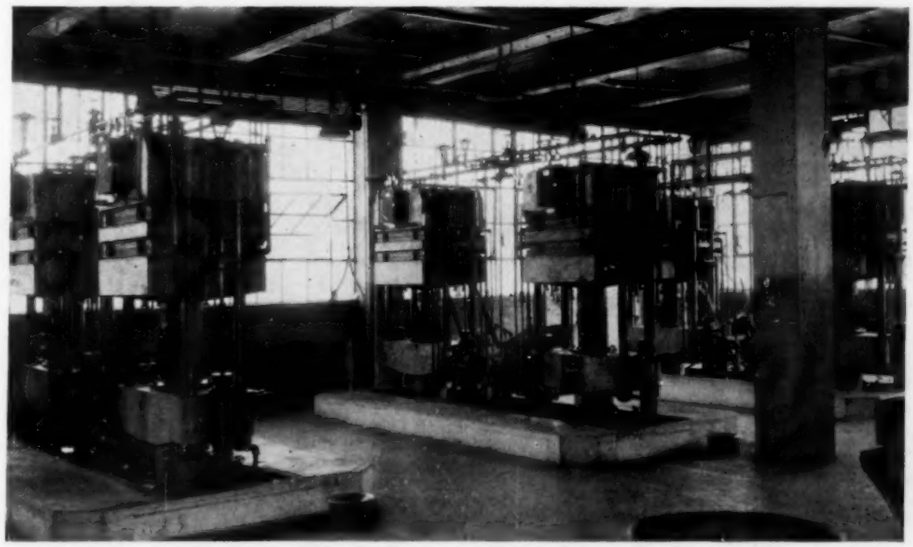
Application to Platen Presses

Applications of single-cam, variable-cure controllers to the operation of hydraulic platen presses have also greatly reduced the cost of the cure in the manufacture of many small rubber articles—at the same time bringing about marked improvement in the product. One method is to employ one of these master controllers with two pilot valves to manipulate a two-pressure hydraulic system, supplying the low pressure for closing the press and the high pressure for locking the press during the curing period.

With this set-up, the press operation commences with both pilot valves open, one cutting-off the high pressure from the press and the other maintaining the low press-closing pressure. The high-pressure pilot valve then closes, admitting high-pressure to the ram, and this pressure is maintained for the duration of the curing interval, when the other pilot valve closes and releases the ram pressure. The same cycle of operations is also sometimes consummated automatically with only one manipulating pilot valve. This valve first opens to admit low pressure to the ram and as the ram pressure builds up, the valve automatically shifts to admit the high locking pressure maintained for the duration of the actual cure.

With either press control, steam is continuously applied to the press plates, either under hand control or, preferably, by an automatic temperature controller which adjusts the supply of steam in accordance with a set press temperature. Provisions may also be made, in cases where excessive gas forms in the mold, to release the internal pressure momentarily for the escape of the gases, *i. e.*, for "bumping", by proportioning the control cam to permit the cam rider to drop and close one or both of the pilot valves for an instant and then resume its position for high pressure control. A number of "bumps", if required, can be brought about in this manner.

Refinements of this order are continuously being



A battery of platen presses operating under control of multiple-cam cycle controllers. The curing process is fully automatic from the time the heater lids are closed until they are reopened.

(Photo, courtesy The Bristol Co.)

made and in the more progressive rubber mills instrumentation is certainly moving forward by leaps and bounds—savings in time and expense, as well as improvement in product, being so pronounced. One application not only leads to others, but often to still greater advance.

For example, at one important mid-western factory, the cam cycle type of control on the pot heater vulcanizers was originally developed for another rubber company, but as installed is quite an improvement. It was deemed advisable, after an investigation of the earlier system, to add several control cams, thereby making the curing process fully automatic from the time the heater lid is closed until it is reopened. Commenting on this refinement, an official of the company now states:

> "I am very glad to say after two years of operation, I cannot recall having any difficulty whatever from their (cam cycle cure control) operations so far as the cures are concerned, each and every cure being an exact duplicate of one another."

In view of the fact that the longest time differential over the full cycle of cure has been in all this time less than 15 seconds, or less than 3 seconds variation in the performance time for any of the several operations involved, this speaks volumes for the value of just one phase of modern rubber factory instrumentation. There are dozens of other phases and applications of instrument control in the rubber factory which afford like opportunities of bringing about important economies in manufacturing methods. These should now command continuous investigation on the part of every rubber executive. The time is ripe and the need not only exists, but is constantly growing.

Koroseal Coated Paper

KOROSEAL paper, consisting of a thin coating of pure Koroseal applied with strong adhesion on high grade 40-pound kraft paper, has been developed and introduced by the Mechanical Division of the B. F. Goodrich Company, Akron. It is described as being applicable to use in any application where a waterproof, oil-proof, grease-proof, air tight or sanitary paper is required. In addition, Koroseal, a synthetic elastic product containing no rubber, is said to be corrosion-proof, non-tainting and non-toxic, odorless, flex-proof and heat-resistant, *i.e.*, it softens in temperatures over 200° F. only, while the coating will seal against itself in temperature of 390° F.

Since Koroseal is a tough film it is said to add to the tear resistance of the paper, while it is also less inflammable than the paper to which it is attached. Koroseal is not affected by sunlight, nor does it oxidize, according to Goodrich engineers. The paper side of Koroseal coated paper can be attached to other surfaces with glue or other paper adhesives. The Koroseal coating, however, will not adhere to other surfaces, although it forms a strong bond with itself when pressed under an electric iron.

Specific applications of Koroseal coated paper include the packaging of foodstuffs, chemicals, medicinals, oils, etc., gaskets, flower pots, shields, and covers for heat insulation to exclude moisture. Other uses are anticipated. It has an overall thickness of .006-inch to .0065-inch, the Koroseal coating being approximately .0025-inch and weighs approximately .308 pounds per lineal yard. It is supplied in 40-inch widths in rolls of approximately 200-yard length.

International Rubber Congress

(Continued from page 237)

products may be diazotized in acetic or sulfuric solution with nitrate of sodium or an organic nitrate, and by combination with amines and phenols, azo dyes derived from rubber are obtained. It is possible to obtain a great number of dyes, which are soluble in water when containing a sulfonic group, and which present all the varieties of colors possible.

Dilated Chlorinated Rubber, by PHILIP SCHIDROWITZ and C. A. REDFARN (England).

When chlorinated rubber is heated in a closed space to between 160 and 175° C. and the pressure within the receiver is suddenly removed, a very light fibrous substance is obtained, which is cellular in character and yet very resistant. The authors described the principal properties of this product, emphasizing especially its thermal and electric properties; chlorinated rubber constitutes a remarkable insulating substance from the thermal and electric point of view. The authors also described a forming machine capable of delivering continuously endless bands, ribbons or cylinders of dilated clorinated rubber.

Contribution to the Knowledge of Chlorinated Rubber, by OTTO SCHWEITZER (Germany).

The maximum quantity of chlorine absorbed by rubber may amount to about 70%. As the isoprene group can by addition combine theoretically only with 56% of chlorine, it will be observed that the action of chlorine on rubber is a reaction of addition at the beginning, and that afterwards a reaction of substitution takes place.

Sometimes, also a secondary reaction is produced, which shows itself in a progressive increase of the viscosity of the solution. Even a complete gelatinization may occur; the gels are at first reversible at the beginning, and then become irreversible, and the syneresis produced, accompanied by a considerable contraction of volume, may finally give rise to a substance that is as hard as stone.

To escape this disadvantage, it is of course possible to operate with very dilute solutions of rubber, but it is advantageous to operate in the presence of inhibitors, of which there are several types described in the patents. The influence of the inhibitors shows that the secondary reaction is catalyzed by small quantities of peroxides.

(To be continued)

Onazote and Rubatex

A NEW material, called Onazote, described as a rubber compound which has been expanded and vulcanized so as to form into countless self-contained cells, has been developed in England by the Expanded Rubber Company, Ltd., of Croyden. In finished form it presents a tough, smooth surface, which may be punctured without deflecting from the material's buoyancy.

Onazote can be supplied in forms with a weight less than one-half that of cork, according to report. Tests of lifebuoys made of this new material are said to have passed all Board of Trade specification tests by so wide a margin that permission has been granted for the submission, for test, of a sample fully 1-inch thinner than those made from any other material.

Tests of Onazote conducted over a 12-month period by the National Physical Laboratory indicate that its water absorption is negligible. It has also been found suitable as insulation board. It weighs from 3 to 7 pounds per cubic foot, depending upon the use to which it is to be put. Rubatex, made by the same company, is described as a soft variety of the same material for use as a waterproof upholstery.

Tire Wear on Road Surfaces

ALTHOUGH results of tests on various aspects of tire wear and tire value per mile have previously been reported, no information has been available on the differences in tire wear caused by variations in types of surface finish on bituminous pavements. In an effort to determine whether or not the surfaces with the highest coefficients of friction also caused the greatest tire wear, and particularly to determine the tire wear characteristics on the coarse-textured "non-skid" type, the "sandpaper" finish type, and the smooth glazed finish type of road surfaces, a series of tests were conducted last year by R. A. Moyer, Associate Professor of Highway Engineering, Iowa State College, and H. W. Tillapaugh, a junior research engineer of the Iowa Engineering Experiment Station, Ames, Iowa. The results of these tests have just been published in the *Proceedings of the Sixteenth Annual Meeting of the Highway Research Board.*

Using a six-cylinder, 1932 model Studebaker for the test car, the tires tested were rotated from one wheel position to another, the change being made every thousand miles when the tire measurements were made. In all, 16,323 miles were traveled on various types of road surfaces, including portland cement concrete, oil-gravel, untreated gravel, sandstone rock asphalt and macadam. Tire pressure was maintained constant at 35 pounds, tire wear tests indicating that at this pressure the tread wear was fairly uniform. The total weight of the car, including driver and observer, was 3,500 pounds, of which 1,760 were on the rear and 1,740 on the front wheels.

The coefficients of friction were determined on various road surfaces with the tires skidding sideways and straight ahead for both wet and dry conditions. During all of the tests, wet and dry bulb temperatures were taken about three times each half day, while records were also taken of wind velocity and wind direction. The test sections were chosen to give the greatest length free from excessive curvature and gradient available in central Iowa. They were located in level prairie country with no towns or heavy traffic to interfere with the conduct of the tests at the standard driving speed.

Results of these tests indicate that the measurement of tire wear by means of a depth gauge provides an accurate method of determining wear on all types of surfaces except possibly untreated gravel in which pitting of the tire reduces the accuracy of the measurements, and that perfect seating of the depth gauge is necessary for such accuracy. The most consistent results in tire wear were obtained on the portland cement concrete and the sandstone rock asphalt surfaces, both of which had about the same wear at 33 and at 52 miles per hour. Greatest tire wear was observed on the untreated gravel, the wear at 33 m.p.h. being 2.7 times that on the concrete at this speed.

It was also observed that at 33 m.p.h. the wear on the rear tires was double that on the front tires on hard surfaces but remained approximately the same on untreated gravel. At 52 m.p.h. the wear of the rear tires on all surfaces was about double that of the front tires. Wear on oiled gravel in hot weather with excess asphalt glazed over its surface was one-half to one-third that obtained on the portland cement concrete surface; in cool weather it was about two-thirds. Tire wear on the right side was 30% greater than that of the left.

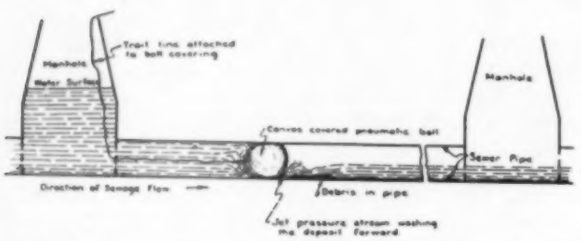
Estimated mileages for the life of the tread on the tires in actual service based on the results of these tests at 52 m.p.h. were computed to be 12,400 miles for untreated gravel; 14,750 miles for sandstone rock asphalt; 15,600 miles for portland cement concrete; 22,800 for macadam; and 42,550 for the oiled gravel with the excess asphalt on the surface. It was also determined that surfaces with a "sandpaper" finish provide considerable extra protection against skidding at no extra expense in tire wear when compared with the coarse open textured types of surfaces.

In correlating the results of the skid tests and tire wear tests, tire wear on oiled gravel, which had the lowest coefficient, was one-half to one-third that obtained on the portland cement concrete; rock asphalt, with the highest coefficient, showed wear only slightly greater than that on the portland cement concrete; the "non-skid" macadam, with coefficients about the same as portland cement concrete, gave average wear slightly lower than that on portland cement concrete; and the untreated gravel, with low coefficients, especially in the side-slide tests, provided the greatest tire wear.

This group of milling huts located in Bandjermasin in Southeast Borneo is the largest of its kind in the Netherlands East Indies. It is one of several groups owned and operated by the Nomura Company, Ltd. The photograph is reproduced through the courtesy of the Johnston Rubber Company, New York City, agents for the Nomura interests.

Cleaning Sewers with Rubber Balls

DURING recent construction of sewer lines in Los Angeles, the Department of County Sanitation Districts discovered a new and novel method of effectively cleaning sand and debris from sewer pipes through the use of inflated rubber beach balls, ex-



Sketch showing action of ball during sewer cleaning.

panded to approximately 30-inch diameter. For use in cleaning sewers the Los Angeles sanitation engineers first inflated the balls and then wrapped them in a covering of canvas or burlap, the edges of which were sewn together. A trail-line, slightly longer than the distance between the sewer manholes, was then attached securely to the outer covering.

The advantages of canvas-covered rubber balls in this connection is explained by A. M. Rawn, assistant chief engineer, Los Angeles County Sanitation District, as follows: When the ball is kicked into the pipe, sewage commences to back up in the manhole and continues to increase in depth until such time as its pressure is great enough to force water under the ball which then commences to move downstream through the pipe. Acting as a compressible floating plug it affords enough obstruction so that a continuous high-velocity jet spurts under and to some extent around the ball, thereby sluicing all movable material ahead to the next manhole.

Should the inflated rubber ball encounter an obstruction which is immovable, such as a joint fin in the pipe, it merely indents to the necessary degree and moves forward. Brick, stones, bottles, loose metal parts, broken pieces of pipe, sand, gravel, settled sludge, and other materials, are easily moved ahead. If the ball's forward progress is stopped by means of some tightly-wedged object, a pull on the trail-line is generally sufficient to set it again in motion.

The canvas covering serves two purposes: It permits ready attachment of the trail-line, and also affords a measure of protection to the inflated ball against puncture by razor blades, glass and sharp metal particles in the sewage sediment. In the event of punctures, tube vulcanizing patches usually serve to repair the ball sufficiently for continued use.

Pliolite Base Enamel

SAID to overcome the disadvantages of regular oil base enamels on concrete surfaces, especially where moisture in any form is present, Pli-Namel has been developed by The Glidden Company, Cleveland, Ohio. The new enamel is made with a 100% Pliolite base and is not affected by the chemical action of lime salts or other minerals in the concrete, according to its manufacturer. Pliolite is the rubber derivative perfected by Goodyear and contains 95% of the rubber hydrocarbons. The Pli-Namel film, formed by rapid oxidation and evaporation, covers the concrete completely and seals the surface against moisture. Prolonged submersion in water will not loosen the bond or cause water-blisters or deterioration. Acids and alkalis poured on a Pli-Namel surface have no reaction on the finish.

The new enamel is said to protect against concrete dusting, withstand moderate traffic, dry with a high permanent gloss, and to cover on an average from 450 to 500 square feet per gallon. It is gas and oil-resistant and is applied by brush. Pli-Namel dries dust free in an hour and can be subjected to light traffic in two to six hours, although heavy traffic should not be permitted for at least four or five days, according to Glidden engineers. It is available in 8 colors, including tile green, battleship gray and brown.

Danish Rubber Manufacturing Industry

ONLY six rubber factories were operating in Denmark in 1931, employing 700 workers, and supplying approximately 26% of the country's demand for rubber products. The industry was given a spurt in 1932 when an official import control was established which prohibited the import of certain articles, including several rubber products. By 1934 the industry comprised 10 factories, with 1,394 workers; by 1935 there were 15 factories, with 1,919 workers. It is estimated that by the end of 1935 local rubber factories were supplying approximately 62% of the domestic demand, according to the Bureau of Foreign and Domestic Commerce.

Rubber footwear is the principal item manufactured in Denmark, accounting for 45% of the total rubber goods production. Mechanical goods in 1935 were estimated as being 25% of the total, bicycle tires and rubber accessories at 20%, and the remaining 5% was divided among a great number of miscellaneous items, including automobile tires and tubes.

Exports from the United States to Denmark were valued at over $2,000,000 each year from 1928 to 1930, but dropped to $311,551 in 1935, and are estimated at $161,233 for the first six months of 1936. An opposite trend is naturally noted in Danish imports of crude rubber which jumped from 566 long tons in 1928 to 3,258 long tons in 1935.

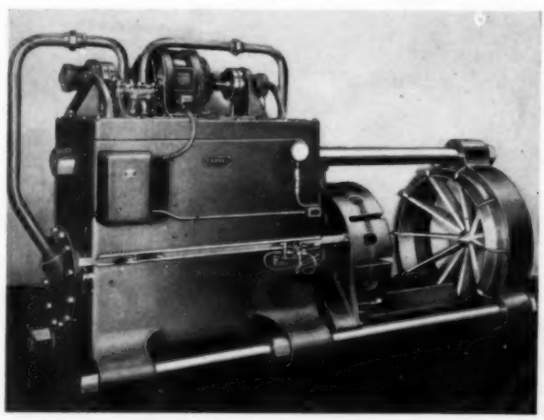
Selecting Curing Temperature

BASED on tests on press cures recently made in the R. R. Olin Laboratories at Akron on a 10% zinc compound cured at 260-287-308° F., it appears that some care must be taken in selecting the curing temperature best adapted to the accelerator used, *e.g.*, with 1% mercaptobenzothiazole and 3% sulfur, the average of the tensile and stiffness at 600% elongation at best cure is 13% better at 260°F. than at 287°F., and 20% better than at 308°F. With D.O.T.G. the average at 287°F. is 40% better than at 260°F. and 6% better than at 308°F. Butyraldehydeamine at either 287°F. or 308°F. is only about 4% better than at 260°F. 1% of tetramethylthiurammonosulfide with 1% of sulfur at 260°F. is 5% better than at 287°F. and 20% better than at 308°F. To summarize, according to the Olin Laboratories, the best curing temperatures for this compound are: with Captax, 260°F.; with D.O.T.G., 287°F.; with 808, any of the three temperatures; and with Monex, 287°F.

New Equipment

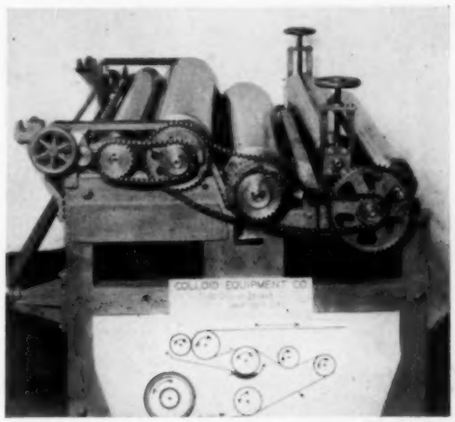
Three-Rod Type Bale Cutter

INCORPORATING several improvements over former models, a new bale cutter with only three tie rods instead of the four previously used, has been introduced by the Farrel-Birmingham Company, Inc., Ansonia, Connecticut. With only one tie rod at the top, the rails on which the bales are placed for cutting are said to be more accessible and the bales can be loaded more easily from above or from the side of the new cutter. Two hydraulic pumps driven by the same motor provide rapid approach to the work, reducing cutting speed at high pressure, and a rapid return of the cross-head to the starting position. The motor and pumps are set into motion by depressing the "start" button. The moving crosshead, which pushes the rubber bale into the knives, is started on its stroke by manual operation of a small pilot valve mounted in a convenient position on the operating side of the machine. At the end of the forward stroke the ram is automatically reversed by an adjustable trip mechanism and the crosshead and ram return to the original start position and stop. The operating cycle is entirely automatic and during this time the operator can be preparing the next bale for the machine. During the first part of the forward stroke, before the cutting begins, both pumps deliver their full volume of oil to the cylinder at a pressure below 200 pounds per square inch. When the pressure builds up to 200 pounds a by-pass valve discharges the entire delivery of one pump directly to the tank, while the other pump continues to furnish pressure to the cylinder up to a maximum of 600 pounds per square inch, which is the recommended setting for the relief valve in the line. At the end of the forward stroke when the pilot valve is automatically tripped, the ram reverses itself and returns to the start position at high speed, with the combined delivery of both pumps discharging to the opposite end of the cylinder as long as the pressure remains below 200 pounds per square inch. A limit switch stops the motor and pumps at the end of the reverse stroke unless the pilot valve is moved to the forward stroke position. The operation of the machine can be continuous if proper handling facilities are available. By means of the pilot valve the direction of the motion of the ram may be reversed at any point of the stroke. The hydraulic cylinder and the tank containing the oil supply are made in one casting which is fitted with a heavy cast cover to form a baseplate on which the power plant is mounted.



Meadows Roller Coater

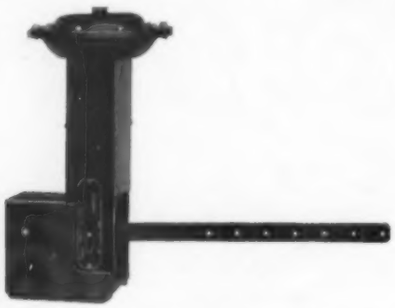
FEATURING a wide range of adjustment which allows the application of diversified materials in many weights of coatings, the Meadows Roller Coater is being distributed by the Colloid Equipment Company, 50 Church Street, New York City. Smooth, high-speed coating of rubber solutions, lacquers, lacquer emulsions and metallic coatings are possible with this new coating machine. The use of a separate furnisher roll is said to assure the application of a smooth continuous coat, without wasteful non-coated margins. The metering rolls are used only to control the weight of the coating, thus providing for accurate control, according to Colloid Equipment officials. A circulating pump and automatic level control of the coating material in the furnish pan can be supplied and the machine can be furnished with or without a knife coating attachment. Drying boxes or festooners can be supplied by the company to match the production of the coater head, and auxiliary equipment, such as embossing heads, slitters, winders and combination machines, can also be supplied. The Meadows coater can handle materials from 40 to 70 inches in width and operates at a speed of from 25 to 75 yards per minute. There is no critical supply reservoir between rolls.



Motosteel Evanaction Lever Motor

DESIGNED and constructed to give instruments of its type a broader field of application, the Taylor Instrument Companies, Rochester, New York, have developed the Motosteel Evanaction Lever Motor. Precision operation characteristics are said to assure a uniform relation between the air pressure applied to its diaphragm motor and the resulting lever travel through its stroke. It is claimed to be practically free from hysteresis. A number of take-off holes are provided throughout the length of the lever so that the force or travel of the motor may be adjusted, while power of either up-stroke or down-stroke can be increased or decreased by means of a spring adjusting nut. The lever action can be reversed by

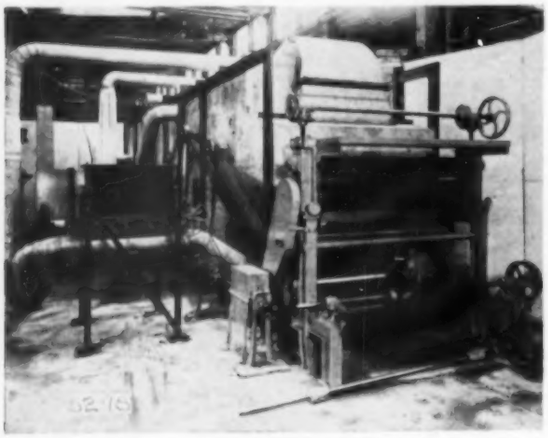
substituting another lever and transposing the fixed and movable pivots. The new motor may be operated by remote manual control, by an electro-pneumatic



switch, or by a pneumatically operated controller. It also may be operated in parallel with a diaphragm valve or other pneumatic equipment, if desired.

Waldron Flocking Machine

A NEW flocking machine, equipped with complete knife coating head, has been developed by the John Waldron Corporation, New Brunswick, N. J. The new machine is equipped with micrometer adjustments for the accurate calibration of the thickness of coating applied. The flocking element is com-



pletely enclosed and assembled with an automatic feeding arrangement for the flock itself, a complete blower system for its distribution, and a complete exhaust system for its recovery, delivering it ready for re-circulation. The rewinding and coating ends are synchronized by means of the layshaft, as may be noted from the illustration herewith, although the rewinding equipment is not visible.

Bristol Portable Pyrometer

ESPECIALLY suitable for measuring temperatures of mill and calender rolls, as well as mold equipment, up to 500° F., a new millivoltmeter-type portable indicating pyrometer has been developed by The Bristol Company, Waterbury, Conn. The new pyrometer can be used with standard thermocouples and extension leads or with surface contact thermocouple ribbons used for measuring roll surface temperatures. Utilization of a cobalt magnet is said to increase the sensitivity and widen the scale of this instrument without sacrifice to accuracy. Models are available in single and double ranges.

Book Reviews

The Futility of Federal Wage and Hour Regulation. By Allen W. Rucker, in collaboration with N. W. Pickering. Farrel-Birmingham Co., Inc., Ansonia, Conn. 3¾ x 7 in. 16 pp.

This booklet, the twenty-second of a series prepared by the co-authors, contains a detailed analysis of the possible results of the Black-Connery Bill as it relates to industrial payrolls. According to the co-authors, this bill will have one of two destructive effects, i.e., it will compel a scaling down of wage differentials, serving to make the minimum wage also the maximum, or it will result in a further shrinkage of employment both in man-hours and in the number of workers. Reasons for these statements are contained in the booklet.

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Neoprene Hydraulic Press Gaskets. (Report N-2). Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware. 6¼ x 9¼ in. (Single loose-leaf page).

The first of a series of reports which will be furnished by the company as part of its Monthly News Letter, recently inaugurated, this one is devoted to a recommended formula for making gaskets from a neoprene compound. Advantages of such gaskets over other types are given. Result of a test on a neoprene gasket in service for more than a year on a press having a 10-inch ram and operating at 1500 pounds per square inch is also given.

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Determination of Neoprene in Vulcanized Compositions. (Report N-3). Rubber Chemicals Divisions, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware. 6 x 9 in. (Loose-leaf form).

Methods, both quantitative and qualitative, for determining the presence of chlorine in a neoprene composition and in compositions suspected of containing neoprene are given in this report, with references cited. Methods of determining whether an unknown compound contains any rubber are also given, one of the best qualitative tests being the determination of the oil resistance of the composition, according to the report.

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American Thermometers. American Schaeffer & Budenberg Division, Consolidated Ashcroft Hancock Co., Bridgeport, Conn. 8 x 11. 48 pp.

Profusely illustrated, this catalog minutely describes the line of industrial thermometers, together with parts and accessories, featured by the company. One section is devoted to a few standard uses and specifications. Tables showing the proper type of thermometer for specific uses are included.

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Graham Water Coolers. (Catalog No. 6). Graham Manufacturing Co., Inc., 220 Delaware Ave., Buffalo, N. Y. 8½ x 11 in. 12 pp.

This catalog describes the standardized steam operated units that furnish cooling water at any temperature down to 35°F., featured by Graham. Both the surface condenser and the barometric condenser types of coolers are described and illustrated. Tables furnish information on principal dimensions, cooler frame capacities, etc.

•

Dust Control. W. W. Sly Mfg. Co., 4700 Train Ave., Cleveland, Ohio. 8½ x 11 in. 16 pp.

Methods of controlling dust in the factory by the use of Sly equipment are explained in this catalog (Bulletin No. S-85) which also includes a series of fundamental questions and answers on the need for such control, what it is and what the requirements are for an efficient dust filter. Features of the company's equipment are pictorially stressed.

Inner Tube Compounding. (Laboratory Report No. 199). Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware, 6 x 9 in. 16 pp.

This report is split into two parts, for passenger car tubes and for bus and truck tubes, respectively. It outlines the characteristics that a good tube should incorporate and discusses the proper types of accelerators, antioxidants, fillers and other compounding ingredients for tube stocks. Several formulas are given and summaries of physical test data are shown. The difference in compounding problems for passenger car and bus or truck tubes is also discussed.

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Technology and the American Consumer. Machinery and Allied Products Institute, 221 North La Salle Street, Chicago, Ill. 5½ x 8½ in. 26 pp.

Fourth in a series on the relation of technology to the American standard of living, this pamphlet discusses the relation of machinery to consumer purchasing power as reflected in wages of factory workers and prices of manufactured goods. Comparisons are made of price and quality of widely used items in the family budget and the purchasing power of wages in 1914 and today. The pamphlet attempts to prove that the American consumer benefits through technological progress.

•

Chemical Burns—Nature and Treatment. National Safety Council, 20 North Wacker Drive, Chicago, Ill. 8½ x 11 in. 8 pp.

Based on the accident prevention experience of a number of industrial employers, this pamphlet, prepared by Edward R. Granniss, Council engineer, discusses the various types of chemical burns, classifies them according to the degree of tissue injury, and gives a number of suggested treatments. Included among the chemicals discussed are acetic acid, ammonia, caustic soda, hydrochloric acid, lewisite, metallic salts, phenol, sodium, sulfuric acid and tar.

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Text-Book Guide—1937-38. Published by Baker & Taylor Co., 55 Fifth Avenue, New York City. 6 x 9 in.

Representing the eighth edition, this catalog has been revised and brought up to date. It is divided into sections so that the user may more quickly discover the book desired, and is supplemented with a complete subject index. In addition to name of book, publisher and price, short descriptions accompany most of the books listed.

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Bonded Built-Up Roofs. Johns-Manville, Inc., 22 East 40th Street, New York City. 8½ x 11. 36 pp.

Complete detailed specifications on all types of the company's built-up roofs are contained in this catalog. A number of drawings illustrate the manner in which the roofing materials are to be applied to various roof decks. An index and condensed table of specifications are included. A complete discussion of roofing materials and their qualities also appears in the catalog.

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Flexible Metal Hose. Chicago Metal Hose Corporation, Maywood, Ill. 8½ x 11 in. 26 pp.

The several styles and various applications of the company's lines of Rex-Weld and Rex-Tube flexible metal hose are described and illustrated in this catalog. Of special interest to the rubber industry is a section devoted to flexible hose for use in connection with platen presses. Data for loop installations are given in this section.

•

Strip-Chart Recording Instruments. General Electric Company, Schenectady, N. Y. 32 pp. 8 x 10½ in.

The more important improvements in the line of portable and switchboard Type CD strip-chart recording instruments for alternating and direct current manufactured by General Electric are illustrated and described in this catalog. The advantages of these instruments are outlined. Complete specifications of each type are given.

Brown Electric CO_2 Meters. (Catalog No. 3005). Brown Instrument Co., Philadelphia, Penna. 8 x 10½ in. 24 pp.

This catalog covers the complete line of the company's indicating and recording CO_2 meters as well as the combined CO_2 and flue gas temperature recorders. A schematic diagram illustrates the operating principle of these meters and describes the passage of the flue gas through the various units. The catalog is profusely illustrated.

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American Seamless Flexible Metal Tubing. (Bulletin SS-3). American Metal Hose Branch, American Brass Co., Waterbury, Conn. 8½ x 11 in. 16 pp.

Data relative to the manufacture and application of the company's flexible metal tubing, which is made without seams, joints, laps, welds or packings of any kind, are included in this bulletin. Typical installations are shown by means of schematic diagrams. A specification table is also included. A series of illustrations depict the various styles available.

•

Brown Pyrometers — Millivoltmeter Type. (Catalog No. 15C). Brown Instrument Co., Philadelphia, Penna. 8 x 10½ in. 40 pp.

This catalog covers the complete line of the company's millivoltmeter pyrometers — indicating, recording and controlling. It describes the new moisture-proof rotary switch, multiple key type switch, control relays, valve mechanisms and thermocouples and accessories. Several new additions to the line, including the Optimatic, Analy-Graph and Protectoglo devices are also illustrated and described.

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Johnson Friction Clutches. Carlyle Johnson Machine Co., Manchester, Conn. 6 x 9 in. 4 pp.

The complete line of the company's friction clutches, many sizes of which have been completely revised, are listed, priced and briefly described in this catalog. Three new models, including a very small "midget type" for fractional horsepower drives, are included. Improvements made in recent years are pointed out, such as the use of molybdenum and chrome nickel steel parts and the adoption of an adjusting screw lock on the clutches.

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American Wide Range Non-Indicating Controllers. (Catalog No. 2400). American Schaeffer & Budenberg Division, Consolidated Ashcroft Hancock Co., Inc., Bridgeport, Conn. 7¾ x 8¾. 8 pp.

Features of the recently-introduced line of the company's wide range non-indicating controllers are depicted in this catalog. Temperature and pressure ranges are given. Various types of bulbs, separable sockets, and fittings are illustrated and briefly described. A price sheet accompanies the catalog.

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Hose Buyers Guide. Electric Hose & Rubber Co., Wilmington, Delaware. 4 x 7 in. 64 pp.

The complete line of hose made by the company is briefly described in this guide, including specific types and grades for practically every special need. Such information as inside diameters, layers of braid, recommended work pressure, net weight per 100 feet and outside diameters are given for each type of hose. The guide is illustrated throughout.

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Neoprene Sponge. (Report N-4). Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware. 6 x 9 in. (Loose-leaf form).

This report contains a recommended compound for press cured neoprene sponge which, according to the report, will not blow quite as much as a rubber sponge loaded to the same extent but will result in a satisfactory product. A standard recommendation for mixing neoprene is included with this report.

Editorial Comment

Coming of the Check-Off?

AN indication of what may be expected from the ranks of organized labor was given a few weeks ago by the action of the Goodrich local of the United Rubber Workers of America. The facts are these: Late in June the Goodrich local sent post cards to its members (presumably to all members) notifying them that the "strike committee" of the various departments would meet the different shifts going to work and that "any member whose dues are delinquent shall be met at the gate . . . and not allowed to enter plant unless he is a member in good standing." Goodrich immediately appealed to the Akron city administration to protect the "right to work" of all employees, including union employees delinquent in their union dues. Fortunately, the union backed down on its endeavor and announced that "other means" would be used to collect back dues from its members.

Consider this situation. Granted that unions cannot exist without funds. Granted that they have a moral right to attempt to collect present and delinquent dues from members. But an attempt to prevent workers from entering a plant for such delinquency smacks of labor plutocracy of the highest order. Only recently Sherman H. Dalrymple, international president of the U.R.W.A., stated that "unions must put greater responsibility behind observance of labor contracts." Is it not violation of such contract to attempt to prevent workers from reporting at their regular stations? Would not such action wreak havoc with working schedules at the plant involved? Is this "labor responsibility?"

It is no secret that behind practically every recent strike, sit-down, or other labor move, lies the desire to have a closed shop. Union members are generally heartily in accord with this desire. But more recently a second strong desire has reared its head in labor disturbances—the check-off. Union organizers and leaders are most anxious to get employers to agree to deduct union dues in advance from the salaries of their employees in the same way they are now deducting social security payments. It can readily be seen why the organizers and leaders desire the adoption of this system but we frankly doubt whether the majority of union members favor it as strongly or if at all.

Employers in general should anticipate the demand for the check-off system. It is bound to come. Threats to stop workers delinquent in their union dues at factory gates, such as the Goodrich instance, is only another step forward to the check-off demand. In the meantime union leaders carelessly handle the definition of union "responsibility."

"Elaston" Proposed as Generic Name

SEVERAL months ago a few leading rubber technologists started a discussion in contemporary English rubber journals with regard to the adoption of a proper name for those materials now referred to as "synthetic rubbers." Although the discussion abroad has apparently simmered down the problem still remains. At the time the discussion was rife, Henry P. Stevens, noted British technologist, suggested the term "synthetic elastics" based on the fact that the so-termed "synthetic rubbers" had some of the elasticity which features crude rubber and that such a term corresponds to "synthetic plastics" which is applied to synthesized plastic materials.

Dr. Harry Barron, a leading British consulting rubber chemist, believes the term "synthetic elastics" is too long for common use and suggested a term more along scientific lines, i.e., "collastic", a combination of "colloidal" and "elastic", stressing the point that the so-termed "synthetic rubbers" are both colloidal and elastic. Other terms have been suggested by British chemists.

Now along comes Prosper E. Cholet, American rubber technologist, associated with H. Muehlstein & Company, Inc., with a suggestion. He states that rubber, or India-rubber as it is often called in the British Empire, was so named because by rubbing it erased. Some of the synthetic elastic plastics presently known, says Mr. Cholet, are used as a base for erasers. A trade-mark must not be descriptive but a name applied to a material or group of materials must be. Therefore, Mr. Cholet proposes the generic word "elaston" to cover the so-called "synthetic rubbers." As a generic name for the synthetic plastics he suggests "plaston."

Readers are invited to continue this discussion.

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The Status of Reclaim

ELSEWHERE in this issue there is reproduced a report on the potential production capacity of reclaimed rubber in the United States based on a survey conducted by the Leather and Rubber Division of the Bureau of Foreign and Domestic Commerce. The survey definitely indicates that potential production capacity far exceeds the potential annual demand for the next several years. Concern has been expressed in some circles that reclaim demand would soon outstrip reclaim production. The result of this survey should serve to allay these fears and to reassure users of reclaim of the availability of ample supply.

CURRENT • NEWS of the Rubber Industry

JULY, 1937

COMMISSION CITES GOLF BALL MAKERS

Charges of Monopolistic and Unfair Trade Practices Are Filed by the Federal Trade Commission Against Two Trade Associations

Charges of monopolistic and discriminatory practices in violation of the Robinson-Patman Act were filed against the Golf Ball Manufacturers Association, the Professional Golfers Association, their officers, and various members of each group, by the Federal Trade Commission on June 30 at Washington, D. C. Eight specific charges were made by the Commission, including exclusive license agreements, discounts and royalties to association members forbidden to non-member retailers, and persuasion, coercion and compulsion of non-member retailers to prevent their selling golf balls at prices less than those designated by the respondent manufacturers.

The effect of these practices, according to the Commission's allegations, has been "unreasonably to suppress competition, bring about unlawful discrimination in prices for goods of the same grade and quality, substantially increase the cost of golf balls to retailers and the public and to discriminate against small business enterprises."

Price Discrimination Charged

In a separate charge, the Commission alleged violation of the anti-price discrimination law in that the respondents "have discriminated in price between different purchasers of golf balls of like grade and quality," the effect of which has been to "lessen competition and to create a monopoly." This is the first time the golf ball manufacturers have been charged with such practices.

The company respondents named in the charges, all of whom are members of the Golf Ball Manufacturers Association, included the following: A. G. Spalding & Brothers, New York; John Wanamaker, Inc., Philadelphia; L. A. Young Golf Ball Co., Detroit; Worthington Ball Co., Elyria (Ohio); Wilson Sporting Goods Co., Chicago; United States Rubber Products Co., Inc., New York; Dunlop Tire and Rubber Co., Buffalo; and the Acushnet Process Corp., New Bedford (Mass.).

According to the Federal Trade Commission's complaint the membership of the Professional Golfers Association of America includes approximately 1,500 of an estimated 2,500 professional golfers throughout the country, practically all of whom engage in the retailing of golf balls and various equipment and supplies.

Officers of the Golf Ball Manufacturers Association, which maintains headquarters at 105 Nassau Street, in New York City, named in the charges were Lawrence B. Icely, president; Edward C. Conlin, vice-president; and William T. Brown, secretary-treasurer. The president, treasurer and secretary of the Professional Golfers Association were also individually named. This group has its offices at 14 East Jackson Boulevard, Chicago.

Wood Cellulose for Tires

Automobile tires made of rubber-covered wood pulp cellulose were predicted by Dr. Harold Hibbert on June 20 during an address before the Forestry Section of the Canadian Chemical Association, at its annual convention in Vancouver, B. C. Referring to the manufacture of rayon and the rapid progress made in many fields by that material he stated recent developments indicated that specially manufactured rayon would replace cotton in automobile tire construction "in a reasonable period of time."

Two New U. S. Tires

The U. S. Tire, described as a popularly-priced tire built especially for independent dealers as a companion line to the Royal and Royal Master lines, will soon be introduced by the U. S. Tire Dealers Mutual Corporation. The new tire, which will be identified on the sidewall with the marking "I.D." (independent dealer), will be available in a complete range of sizes for both passenger cars and trucks. U. S. Tire Dealers Mutual Corporation is also featuring cushion shoulder construction in all sizes of U. S. Royal Fleet Delivery, Fleetway and Rayon Cord truck tires. Cushion shoulder consists of a section of special compound, cool-running stock built into the truck tire tread, deep down in the shoulder below the point of smooth tread wear. This new construction is said to generate less heat in the shoulder area and to dissipate heat generated by the constant flexing of the cord body.

RAISE TIRE PRICES TO AUTO INDUSTRY

Original Equipment Tire Prices Are Raised 15% on July First to Bring the Margin Close to the Increasing Cost of Materials

Prices of original equipment tires delivered to the automobile manufacturers were generally raised 15% on July 1st. Many contracts between rubber companies and the automobile makers were up for renewal on this date and the new contracts are reported to include the upward revision. Because most automobile manufacturers are well stocked with tires for current requirements they are not expected to feel the increase greatly until the Fall, when the 1938 models will make their appearance.

Announcement of the upward revision of original equipment tire prices will probably result in a slackening off of production in Akron tire factories, it is reported. This situation will be brought about, it is believed, because many of the automobile manufacturers made heavy purchases prior to the price increase. Slowing up of production will result either in early lay-offs of workers or adoption of share-the-work schedules.

Status of Replacement Tires

Replacement tire prices, which have been raised twice since the first of the year, are not involved in the present increase. Original equipment contracts entered into last year at lower figures than are justified by costs during recent months have necessarily been carried out at comparatively low prices. The 15% increase on such tires is expected to be favorably effective on the third and fourth quarter earnings of the companies handling this business.

While the profit margin on original equipment tires is never as large as that on replacement tires the production volume made possible by original equipment contracts has an important effect on annual earnings because of economies made possible by such volume. It is not yet known whether the 15% increase applies to the entire range of original equipment sizes or only to the standard heavy volume sizes.

MARK ANNIVERSARY OF CARBON USE IN TIRES

The current year marks the 25th anniversary of the introduction of carbon black into tire manufacturing in this country. The history of its use in the rubber industry actually goes back to England, according to one of the leading black manufacturers, where in 1910 the Silvertown interests expressed a desire to turn out a tire with coloring other than the white which was typical of tires of that day. Silvertown communicated with the Binney and Smith Company, in London, with the request that that concern furnish them with a carbon black they could use in small percentages to incorporate in their tire compounds in order to secure a grayish tint to the finished tire. They were given a type of black indigenous to the West Virginia plants of Binney and Smith.

Silvertown constructed several tires incorporating carbon black, some of which were secured and tested by the B. F. Goodrich Company, of Akron. Goodrich put these tires through a rigid series of road tests and, according to our information, found them to be an improvement over existing tires then in use in America. Correspondence with the Silvertown people revealed that the only difference in these tires from other similar types was the incorporation of about 16 to 17% of carbon black in the compound.

Goodrich Calls Kitchel

With this information on hand, Goodrich engineers started to experiment with larger percentages of carbon black in their tire compounds and found increasing benefits, sufficient to justify a change from former manufacturing precepts and to swing over to the use of carbon black. In 1912 Goodrich asked Binney & Smith to send a technical representative to Akron to discuss the use of carbon black in tires. A. F. Kitchel, now president of the company, made the trip and answered a barrage of questions as to the manufacture, chemical composition, physical characteristics, etc., of carbon black, at the conclusion of which Goodrich entered an order for a carload of carbon black, the first ever ordered by a tire manufacturer.

Several weeks later Mr. Kitchel was called back to Akron and was informed that Goodrich had decided to change their compounding practices and intended to start production of a black tire using a large percentage of carbon black in the compound. He was told that Goodrich was planning a $1,000,000 advertising campaign on the new tires and naturally wanted protection on quantity and price of Binney and Smith's carbon black. After a series of negotiations a three-year contract was signed calling for the delivery of carbon black at 4.4 cents a pound, f.o.b. West Virginia.

Binney and Smith started shipments under the contract and continued to do so for several years. When the war broke out in 1914 the carbon black house continued its shipments at the contract price although raw material and labor costs started to rise. It was soon evident that the company was losing money on every shipment made to Goodrich and Mr. Kitchel took this problem to the Akron factory. The current market price for carbon black at that time was 8 cents per pound and after Mr. Kitchel had outlined the company's problem, Goodrich voluntarily adjusted the contract by raising the contract price by 50%, from 4.4 cents to 6.6 cents per pound, f.o.b. West Virginia.

It was at this time, too, that Binney and Smith was released from supplying its carbon black exclusively to Goodrich and soon Goodyear, Republic, Ajax, Mansfield, Morgan and Wright, and other prominent tire firms of the day were utilizing carbon black in their tires. Since then the use of carbon black in the rubber industry has expanded tremendously with the natural result that the carbon black industry itself has had to increase its production capacity many times over to keep pace with demand.

Coming Events

Aug. 8. Fishing excursion of Los Angeles Group, Rubber Division, A. C.S., leaving from San Diego Harbor.

Aug. 13. Outing of Boston Group, Rubber Division, A.C.S., at "Fieldston" in Marshfield, Mass.

Sept. 9-10. Rubber Division A.C.S., Powers Hotel, Rochester, N. Y.

Oct. 11-15. National Safety Council. (26th Safety Congress). Kansas City, Mo.

Oct. 18-20. National Association of Independent Tire Dealers, Hotel Stevens, Chicago, Ill.

Dec. 5-11. Exposition of Chemical Industries Grand Central Palace, New York City.

New Cabot Gasoline Plant

Godfrey L. Cabot, Inc., Boston, Mass., has announced plans for the construction of a gasoline plant in the Estes pool of West Texas to treat casinghead gas now wasting into the air from oil wells in this pool. The residue gas, after extraction of gasoline, will be piped to Wickett, Texas, and burned in addition to Cabot's new carbon black plant which started operating recently.

New Goodyear Tire

Designated as the R-1, a new tire has been introduced by the Goodyear Tire and Rubber Company, Akron, which is said to represent a new top quality safety tire at no advance in price. The R-1 features a wider, flatter tread, giving more road contact and more traction, uses 12% more rubber in the tread, has higher, broader shoulders, and utilizes a supertwist cord carcass construction.

RUBBER DIVISION, A.C.S., MEETS SEPTEMBER 9-10

The Rubber Division, A.C.S., will hold its next meeting on Thursday and Friday, September 9 and 10, at the Powers Hotel in Rochester, New York, in conjunction with the 94th meeting of the American Chemical Society. The Hotel Seneca has been selected as headquarters for the Society, while the Powers Hotel will be headquarters for the Rubber Division.

C. W. Christensen, secretary-treasurer of the Division, urges all members planning to attend to make reservations as early as possible. The deadline for receiving papers to appear on the program of the Division was set for July 14. Dr. A. R. Kemp of the Bell Telephone Laboratories, New York City, is chairman of the Papers Committee.

As usual a number of interesting trips to factories in the vicinity of the convention city are being arranged, while a golf tournament will be held on Thursday afternoon at the Oak Hill Country Club.

Visit R.A.B.R.M. Laboratories

The Research Association of British Rubber Manufacturers played host to the group of American business executives and bankers who are currently making a tour of European research laboratories under the auspices of the Division of Engineering and Industrial Research of the National Research Council, New York City. The American delegation, headed by Maurice Holland, director of the Council's engineering and research division, visited the Croyden laboratories of the R.A.B.R.M. on May 27. It was welcomed by B. D. Porritt and Dr. S. S. Pickles and mention was made in the welcoming address of the close working relations which have existed between British and American rubber manufacturers since the early beginnings of the rubber industry. It was also revealed that both Dr. Pickles and Mr. Porritt, the latter director of research for the R.A.B.R.M., had been associated with firms originally established in England by American enterprise, i.e., George Spencer, Moulton & Co., Ltd., of Bradford-on-Avon, and the North British Rubber Co., Ltd., of Edinburgh, respectively. The American guests were conducted throughout the laboratories and were shown the testing methods employed by the Association. A special series of demonstrations was arranged for their benefit.

F.T.C. Cites Ajax Tire

The Ajax Tire and Rubber Corporation, New York City, has entered into a stipulation with the Federal Trade Commission to stop representing that it was founded in 1904, when it was actually founded in 1934, according to the F.T.C., and that it manufactures tires and tubes when it is merely a distributor and does not own or operate a factory.

NEW YORK GROUP HOLDS 4th OUTING

Approximately 400 members and guests attended the 4th annual all-day outing of the New York Group, Rubber Division, A.C.S., held at the Alps Castle, Preakness (Paterson), New Jersey, for the third successive year. A complete program, which included baseball, tennis, golf, horseshoe pitching, boccie, and boxing, was enjoyed by the crowd. W. W. Higgins (United Carbon) was chairman for the day, ably assisted by W. C. Lingvall (U.S. Rubber). Special trophies were awarded by various companies for each of the main events, as follows: Baseball—*India Rubber World;* Tennis—THE RUBBER AGE; Golf—United Carbon Co.; Horseshoe Pitching—Flintkote Co.; Boccie—E. I. du Pont de Nemours and Co. The outing was held on June 12.

Nine companies were represented by teams in the soft ball tournament which finally dwindled down to a decisive game between those of the Overman Cushion Tire Company and du Pont, won by the former by a score of 7 to 4. This gives Overman possession of the cup trophy for another year, the same team having beaten du Pont in the final game last year, although du Pont was the victor in 1935. F. S. Conover (Naugatuck) handled the soft ball tournament.

Eighteen contestants took part in the tennis tournament, which was played on a poorly rolled court. The trophy went to R. K. Opper (U.S. Rubber), who was also in charge of the event. A. D. Aishton (Rubatex) was the runner-up. In the boccie contest, handled by J. H. Carroll (R. E. Carroll), first prize went to Charles A. Finkle (Okonite), second to Joseph Pierro (Okonite), third to Dr. Wm. F. Tuley (Naugatuck), and fourth to A. W. Meyer (U.S. Rubber). William Lamela (Okonite) repeated his conquest for first prize in the horseshoe pitching contest, with L. W. Moore (U.S. Rubber) and A. W. Meyer (U.S. Rubber) winning second and third prizes, respectively. D. C. McRoberts (Kaysam) was in charge of this tournament.

As usual, a number of members and guests turned out for the golf tournament, handled this year by H. B. McCreary (United Carbon). R. J. Ozel (U. S. Rubber) won the silver loving cup by shooting a low gross score of 77, while other prizes were awarded as follows: *Low Net Score*—C. A. Anderson (Manhattan Rubber); *High Score*—Fred Traflet (Pequanoc); *Team Prize*—H. D. Bainbridge and Mr. Smoley (International Smelting and Refining). Frank Woznick (Irvington Varnish) was also given a prize for getting two birdies.

Boxing Bouts Are Held

Because of the crowd, dinner was served in two sessions, the first getting under way about 4:30 P. M. Shortly after the first dinners were completed boxing matches were held on the tennis courts and several lively bouts were seen. O. C. Work (Overman) arranged these matches.

In addition to the special trophies donated as first prizes for the various athletic events, the additional prizes and awards were made possible through the cooperation of the following concerns: Baker Perkins Co., Binney & Smith Co., Godfrey L. Cabot, Inc., R. E. Carroll, Inc., Container Corporation of America, Farrel-Birmingham Co., Inc., General Atlas Carbon Co., *India Rubber World,* Naugatuck Chemical Division of U. S. Rubber Products, Inc., N. J. Zinc Sales Co., Pequanoc Rubber Co., Rare Metal Products Co., THE RUBBER AGE, Henry L. Scott Co., Southeastern Clay Co., Stamford Rubber Supply Co., R. T. Vanderbilt Co., Vansul, Inc., C. K. Williams & Co., and Wishnick-Tumpeer, Inc.

N.A.I.T.D. Sets Meeting Date

The National Association of Independent Tire Dealers, Inc., which maintains headquarters at 250 West 57th Street, New York City, will hold its 17th Annual Convention at the Hotel Stevens, Chicago, on October 18-20. Business sessions will be held every afternoon during the three-day convention while the annual banquet will be held on the evening of October 19. A committee will shortly be appointed to consider plans, policies and recommendations as to retreading and recapping of tires. The findings of this committee will be reported at the Chicago meeting.

Form Mahoning Valley Co.

Incorporation papers have been filed in Columbus, Ohio, for the Mahoning Valley Rubber Company, 2228 South Avenue, Youngstown, Ohio. The new firm is authorized to issue 250 shares of no-par value stock. Incorporators included David C. Haynes, Robert B. Nevin and Elinor J. Walker. The concern, which is being managed by Clifford Williams, who has been associated with Goodyear for the past 11 years, will distribute miscellaneous rubber products.

Photos by staff of THE RUBBER AGE and C. P. Morgan (Vulcanized Rubber Co.)

Action scenes taken at the Fourth Annual Outing of the New York Rubber Group held at the Alps Castle on Saturday, June 12, 1937.

Names in the News

ERNEST I. KILCUP, managing executive, Davol Rubber Company, Providence, Rhode Island, received the honorary degree of Doctor of Science from the Rhode Island College of Pharmacy on June 9 in recognition of his services as an executive and honorary officer of the National Association of Credit Men as well as for his services in the pharmaceutical field.

STANLEY W. CAYWOOD, general sales manager, international division, B. F. Goodrich Company, Akron, headed a list of twenty-five employees who completed 20 years of service with the company last month. He received his service pin on June 19.

WILLIAM J. FRISBY, associated with the B. F. Goodrich Company for the past 18 years, has been named director of sales of the Jenkins Capless Tire Valve Division of Jenkins Bros., Inc., Bridgeport, Conn. He will make his headquarters in Akron.

JAMES R. CALDWELL, president, Wooster Rubber Company, Wooster, Ohio, addressed the Wooster Board of Trade early last month and told of his experiences with other boards of trade.

W. S. COE, with the Development Department of U. S. Rubber Products, Inc., Passaic, N. J., for the past several years, has been transferred to the Naugatuck Chemical Division, where he will do research and development work on reclaiming rubber at the Naugatuck, Connecticut, laboratory.

LIEUTENANT-COLONEL CHARLES T. CAHILL, publicity director, United Shoe Machinery Corporation, Boston, Mass., has been elected captain of the Ancient and Honorable Artillery Company of Massachusetts. This organization is the oldest military group in the United States.

ROBERT H. HABERSTROH, formerly with the research and development department of the Boston Woven Hose and Rubber Company, Cambridge, Mass., has joined the development department of the American Steel and Wire Company, Worcester, Mass.

J. EDMUND GOOD has been appointed sales manager of the Woburn Degreasing Company of New Jersey, Harrison, N. J., succeeding DR. ERICH SCHUELKE, recently resigned.

M. A. CLARK, industrial relations manager, Detroit plant, U. S. Rubber Products, Inc., was awarded the honorary degree of Master of Industrial Engineering at the recent commencement of the Lawrence Institute of Technology, Detroit.

Fox Opens Laboratory

Edward Fox, rubber technologist, has opened a general analytical laboratory at 153 Centre Street in New York City, and will specialize in rubber and latex work. Graduated from the Massachusetts Institute of Technology in 1923 with a degree in chemical engineering, Mr. Fox worked for several years with Dr. L. E. Weber, noted consulting rubber chemist. More recently he was affiliated with the Filatex Corporation, of New York and Trenton, N. J., manufacturers of latex thread.

L. J. WALDRON has been named general sales manager of the Pennsylvania Rubber Company, Jeannette, Pennsylvania, succeeding A. KOEHLER who recently resigned to become vice-president of the Vogue Rubber Company, Chicago. Mr. WALDRON has been with Pennsylvania since 1915.

R. S. WILSON, vice-president in charge of sales for the Goodyear Tire and Rubber Company, Akron, addressed the members of the American Marketing Association at their annual mid-West meeting, held in Cleveland on June 26.

DR. GODFREY L. CABOT, president, Godfrey L. Cabot, Inc., Boston, Mass., has set up a fund of $615,773 at Harvard University to be used in long-range pioneering research into plants, especially trees, and the rate at which they store solar energy in forms suitable for human use. Dr. CABOT is a member of the Class of 1882.

FRANK GABBE, chief engineer, General Tire and Rubber Company, Akron, delivered an address at a safety meeting sponsored by the Lima Tire and Supply Company at Lima, Ohio, on June 8.

R. A. BOYER, managing director of Goodrich (France) has returned to France after spending several weeks at the Akron factories. Prior to sailing he stated that there is a great deal more speculation in the United States on the possibility of an early European war than there is in France.

WILLIAM G. NELSON, divisional manager, production control department, Detroit plant, U. S. Rubber Products, Inc., recently received an honorary Doctor of Science degree from Ottawa University.

SIR GEORGE BEHARRELL, managing director of the Dunlop Rubber Company, Ltd., Birmingham, England, and a director of Imperial Airways, has been named chairman of the aeronautical concern to succeed the late SIR ERIC GEDDES. SIR GEORGE is widely known in transport and industrial circles.

LOS ANGELES NEWS

The Los Angeles Chamber of Commerce plans to devote the September issue of its monthly publication, *Southern California Business*, to the rubber industry. The thought behind the decision to feature the rubber industry of Los Angeles is educational, according to Franklin Cole, head of the Chamber in charge of publication work. The issue will contain statistics which will show the trend of the industry. Articles based on various phases of the industry will also appear. T. Kirk Hill, chairman of the Los Angeles Group, Rubber Division, A.C.S., has offered the Chamber of Commerce the full cooperation of the group in connection with the special issue.

Ed Royal (H. M. Royal Company), who is handling the mid-Summer deep sea fishing trip to be staged by the Los Angeles Rubber Group out of San Diego on Sunday, August 8, reports that he expects a full quota of forty members and guests. The ship will leave San Diego at 3 A. M. for the Coronado Islands off the Mexican coast. Prizes will be given for various contests. Headquarters for the fishing group, and their wives and friends, will be maintained at the Hotel San Diego.

The Golden State Rubber Mills, now located at 651 East 61st St., will move to a new location this Fall, work on the new building to start soon after possession of the site is secured on September 1. A. S. Rocklen, president and general manager, is already in the midst of plans for a model factory.

Charles N. Merralls, president of the Rubbercraft Corporation of California, Inc., who has made a trip east to New York and other points and who is coming home by way of the Panama Canal, will disembark at Seattle instead of Los Angeles and make the trip from that point home by automobile arriving in Los Angeles about the middle of August. While in the East he has been looking over additional equipment for his factory. A new modern type boiler has increased the power at the factory sufficient to carry a heavier load.

D. R. Radford, president of the West American Rubber Company, Inc., 410—19th Ave., N., who accidentally broke an arm while operating his yacht, is now recovering. Incidentally, Mr. Radford who is a yachting enthusiast has recently bought a new 45-foot racing boat which he has christened *The Lavengro*. The vessel is a model in its class and is anchored at New Anchorage, home base of the Los Angeles Yacht Club.

GOODRICH OPENS CADILLAC FACTORY

With an initial capacity of 500,000 pounds of rubber products per month, the Cadillac, Michigan, plant of the B. F. Goodrich Company was opened early this month. The new plant, formerly occupied by the Acme Motor Truck Company, has been completely reconditioned. It is of brick and steel construction and contains 117,000 square feet of floor space. It will be devoted exclusively to the manufacture of rubber products for the automobile industry, such as channeling, body and engine mountings, and various types of molded and extruded goods. Approximately 250 are currently working at the new Goodrich unit, with an estimated total of 500 employees to be on the payroll when capacity production is reached.

Goodrich also recently announced that it was undertaking an expansion program in Akron which will include the construction of a new addition to the Philadelphia Rubber Works, the reclaimed rubber division, to cost approximately $110,000, as well as the expenditure of $500,000 for modernizing machinery, equipment and processes in the Philadelphia plant. The new addition will comprise three separate buildings and represents the largest Goodrich construction program in Akron since 1929.

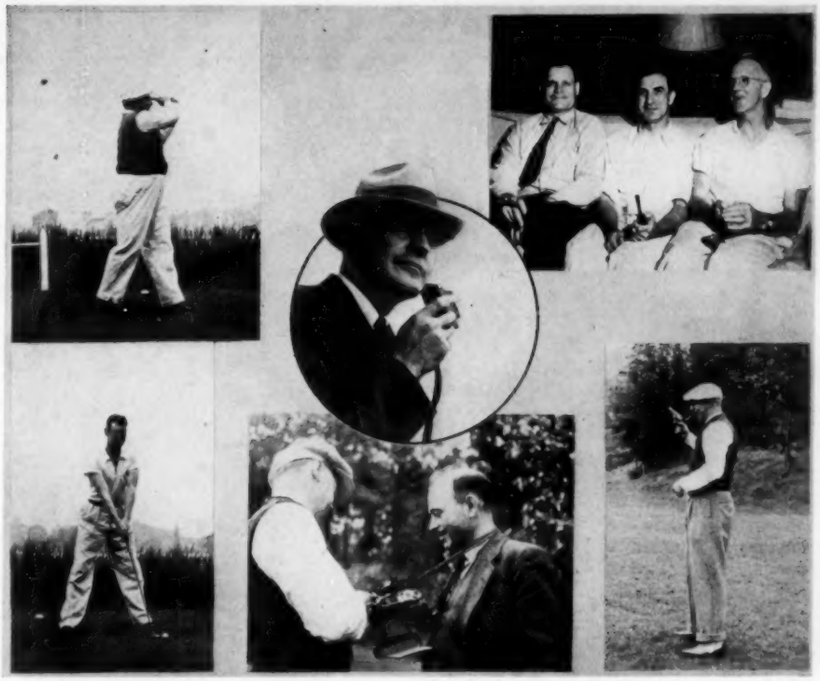
The new Goodrich tire factory at Oaks, Pennsylvania, which has 175,000 square feet of floor space and which employs 450 workers, is already in operation. This unit, constructed at a cost of $1,350,000 and which has a capacity of 5,000 tires per day, is producing original tire equipment for Ford and Chevrolet. With the completion of the Oaks and Cadillac plants, Goodrich now has eleven rubber fabricating units and one textile unit operating throughout the world.

SEIBERLING FAMILY FILES STOCK SUIT

Eight members of the family of F. A. Seiberling filed suit on July 2 in the Common Pleas Court of Akron against Edgar B. Davis of Luling, Texas, to determine the ownership of 60,000 shares of U. S. Rubber stock, valued at $3,000,000. The suit is an outgrowth of a settlement made by F. A. Seiberling of $6,500,000 in debts dating back to 1927. The Ohio Goodyear Securities Company, of which Mr. Davis is a stockholder, was also named in the suit.

According to the petition, Mr. Davis, a former vice-president of U. S. Rubber and now a leading oil promoter in Texas, accepted collateral in the Prudential Securities and Realty Company from Mr. Seiberling through the defendant corporation. This was at the time when Mr. Seiberling was pressed for back debt payments. Now, according to the suit, Seiberling has paid all obligations but has not yet recovered the 60,000 shares of U. S. Rubber stock which was put up as collateral, which is the basis of the suit.

AKRON RUBBER GROUP HAS ANNUAL OUTING



Upper Left: Leslie Cooper (Firestone) gets a good one off. Upper Right: Messrs. Powers, Allison and Warner, officers of the Akron Group, in a restful mood. In the Circle: V. L. Smithers at the "mike." Lower Left: John Street (Firestone) driving off the first tee. Lower Center: Walter Voth (Akron Standard Mold) inspecting the camera of Jack Von der Heide (Farrel-Birmingham). Lower Right: Walter Voth again, in his role as starter of the golf tournament. (Photos by Allyn K. Thayer).

The annual outing and golf tournament of the Akron Group, Rubber Division, A.C.S., was held on June 18 at the Silver Lake Country Club, with approximately 350 members and guests participating in the various events. Two hundred golfers contended for the three prizes, H. D. Bainbridge (International Smelting & Refining) winning an eight-day strap watch for the longest drive on the No. 1 tee, H. O. Newman (Goodrich) getting a duffle bag for the nearest approach shot on the No. 17 tee, and L. V. Cooper (Firestone) being awarded the duffer prize, a dozen golf balls, for the worst get-off on the No. 1 tee.

A loud speaker was installed near the No. 1 tee and very explicit instructions were given to each golfer as he teed off. As a further aid in timing their drives, the golfers had the dubious satisfaction of hearing a .32 revolver go off, brought along by some considerate member who was anxious to see to it that each tournament participant had the full benefit of quiet and peace. The gallery also contributed valuable advice from time to time.

A full course dinner topped off the day's festivities, with V. L. Smithers of V. L. Smithers, Inc., acting as master of ceremonies, assisted by Walter Voth of the Akron Standard Mold Company. In addition to the golf prizes, approximately 150 door prizes were distributed at the dinner via the lucky number route. R. E. Cartlidge (Midwest Rubber) handled the distribution of the prizes which were made possible by the following companies:

Adamson Machine Co., Akron Chemical Co., Akron Paint & Varnish Co., Akron Standard Mold Co., American Cyanamid & Chemical Corp., American Mineral Spirits Co., American Zinc Sales Co., Anaconda Zinc Sales Co., Binney & Smith Co., Bridgwater Machine Co., Godfrey L. Cabot, Inc., Canfield Oil Co., Cannon Mills, Columbia Alkali Corp., Dill Mfg. Co., E. I. du Pont de Nemours & Co., Inc., Russ Farley, Farrel-Birmingham Co., Inc., Firestone Tire & Rubber Co., Forbes Varnish Co., General Atlas Carbon Co., General Tire & Rubber Co., B. F. Goodrich Co., Goodyear Tire & Rubber Co., C. P. Hall & Co., Stanley Harris, Herron & Meyer, J. M. Huber, Inc., Imperial Oil & Gas Products Co., *India Rubber World*, Inland Mfg. Co., Inland Rubber Co., Johnson Rubber Co.

F. F. Meyers, Midwest Rubber Reclaiming Co., Monsanto Chemical Co., National Rubber Machinery Co., National Standard, Naugatuck Chemical Division of U. S. Rubber Products, Inc., New Jersey Zinc Co., Ohio Rubber Co., Philadelphia Rubber Works, Poncet Davis, R. C. A. Rubber Co., Republic Rubber Co., St. Joseph Lead Co., A. Schrader's Son, A. Schulman, Inc., Seiberling Latex Products Co., Seiberling Rubber Co., V. L. Smithers, Inc., Bob Sperry, Superior Zinc Co., Titanium Pigment Corp., United Carbon Co., R. T. Vanderbilt Co., Vultex Chemical Co., Wellington Sears Co., White & Co., Wishnick-Tumpeer, Inc., and the Xylos Rubber Co.

Financial News

GENERAL TIRE OFFERS ADDITIONAL SHARES

Stockholders of the General Tire and Rubber Company, Akron, were offered 64,697 additional shares of the company's common stock last month, rights providing for the purchase of one share for every seven shares already held. The shares, which have a par value of $5.00, were offered at a price of $20.00 per share, the offer expiring on July 2.

Action of the directors in approving the additional shares follows the recent approval of stockholders of the company's proposal to increase the common stock from 500,000 to 750,000 shares. The additional authorized stock brings the total outstanding common stock to 517,572 shares. Proceeds from the sale of the additional 64,697 shares are expected to be used for payment of bank loans, to meet accrued preferred dividends, and to provide additional working capital. It is believed that most of the additional working capital will be used in connection with General's new mechanical goods plant at Wabash, Indiana.

Underwriters of the additional authorized stock included Lehman Brothers, New York; First Cleveland Corporation, Cleveland; Kidder, Peabody and Company, G. M. P. Murphy and Company, and W. E. Hutton and Company, all of New York. The Guaranty Trust Company, New York, acted as the warrant agent.

37% GAIN RECORDED BY FIRESTONE TIRE

Reflecting improved conditions in the rubber industry, earnings of the Firestone Tire and Rubber Company, Akron, increased by 37% in the first half of its current fiscal year as compared with the similar period of the preceding year, according to an announcement made by Firestone on June 14. Net profit for the six months ended on April 30, 1937, amounted to $3,766,006, after deductions for depreciation, interest, Federal income taxes, and other charges, but before provision for the Federal surtax on undistributed profits.

Based on the six-month report, net profit is equal to $1.23 each on 1,932,497 shares of $10-par common stock, after dividend requirements on the 6% preferred stock. Net profit for the six months to April 30, 1936, amounted to $2,754,675, or 70 cents a common share.

Lee Rubber and Tire

Six months ended April 30: Consolidated net income of $473,277, after Federal and state income taxes, depreciation and interest, equivalent to $1.83 a share on 257,465 shares of $5-par capital stock, excluding shares in the treasury. This compares with $101,297, or 39 cents a share on 256,564 shares, earned in the similar period of the preceding year. No mention was made in the report of provision for the Federal surtax on undistributed profits.

Thermoid Plans Issue

The Thermoid Company, Trenton, N. J., has filed a statement with the Securities and Exchange Commission for a proposed issue of $10,200,273 of bonds and stocks. The issues would include $2,450,000 of 5% bonds, 42,104 shares of $10-par preferred stock, 7,349 warrants for $1-par common stock, and 701,720 shares of $1-par common stock. Proceeds from the sale of the new issues would be used for the repayment of debts and for working capital, according to the registration statement. Fuller, Crittenden and Company was named as the underwriter.

New Monsanto Shares

The Monsanto Chemical Company, St. Louis, Missouri, will shortly issue 50,000 shares of no-par $4.50 cumulative preferred stock, according to an announcement from the company. Proceeds will be used for capital additions, replacements and improvements to various Monsanto plants. Monsanto's earnings in 1936 cover the dividends on the proposed new issue approximately 20 times, according to Edgar M. Queeny, president of the company. Edward B. Smith and Company, New York brokerage house, will handle the offering which was expected to be made on or about July 15.

Chemical Exposition Progress

Two entire floors out of the three reserved in the Grand Central Palace in New York City for the 16th Exposition of Chemical Industries, which will be held on December 6 to 11, 1937, have already been sold to exhibitors and one-fourth of the total available space on the third floor is already under contract, all of this fully five months in advance of the exposition, according to Charles F. Roth who has personally directed each chemical exposition since the first one was organized in 1915. The Student Course in Chemical Engineering will again be presented at the 1937 Exposition which also features a slogan contest with a $250 prize to the person who submits "the best descriptive expression encompassing the purposes and benefits redounding to the common good from the activities of the chemical industries." Rules of this contest will be announced shortly. Preparations are being made so that visitors to the Exposition will find the arrangement of exhibit material particularly suited to thorough inspection in minimum time.

CONSUMPTION IN MAY IS LESS THAN APRIL

Consumption of crude rubber by manufacturers in the United States for the month of May is estimated to be 51,733 long tons, which compares with 51,797 long tons for April. May consumption shows a decrease of less than 1% under April and is 2.2% over May a year ago according to statistics released by the Rubber Manufacturers Association. Consumption for May, 1936, was 50,612 (revised) long tons.

Gross imports of crude rubber for May were reported to be 50,840 long tons, an increase of 41.8% over the April figure of 35,850 long tons and 42.8% over the 35,598 long tons imported in May 1936.

Total domestic stocks of crude rubber on hand on May 31 were estimated at 172,985 long tons, which compares with April 30 stocks of 174,934 long tons and 262,415 (revised) long tons on hand May 31, 1936.

Crude rubber afloat to United States ports as of May 31 is estimated to be 58,542 long tons, which compares with 72,530 long tons afloat on April and 48,860 long tons afloat on May 31 a year ago.

May reclaimed rubber consumption is estimated at 14,693 long tons; production at 15,793 long tons; and stocks on hand on May 31, at 14,647 long tons.

TIRE SHIPMENTS GAIN 32.4% OVER FEBRUARY

Shipments of pneumatic casings during the month of March are estimated at 5,787,051 units, an increase of 32.4% over February and 50.0% above shipments made in March, 1936, according to statistics released by the Rubber Manufacturers Association.

Production of pneumatic casings for March is estimated at 5,915,575 casings, an increase of 12.8% over February and 62.5% above March, 1936.

Pneumatic casings in the hands of manufacturers, March 31, 1937, are estimated at 12,448,167 units, an increase of 1.1% over the stocks on hand February 28 and 37.0% above stocks on hand March 31, 1936.

The actual figures are as follows:

PNEUMATIC CASINGS

		Shipments	*Production*	*Inventory*
Mar.,	1937	5,787,051	5,915,575	12,448,167
Feb.,	1937	4,370,630	5,245,894	12,307,681
Mar.,	1936	3,857,352	3,640,091	9,086,719
Mar.,	1935	4,204,131	4,345,581	11,675,268

Goodrich Awards Essay Prizes

The B. F. Goodrich Company, Akron, has announced the winners of its essay contest on the subject, "Why I Would Like to Have Goodrich Silvertown Tire on My Farm Equipment." First prize, $1,000, went to William R. Brown, Schenectady, New York; second prize, $250, to Frank Worth, Shreve, Wayne County, Ohio; and 490 additional cash awards, aggregating $4,000, were given to farmers throughout the country.

A.S.T.M. HOLDS ITS FORTIETH MEETING

The American Society for Testing Materials held its Fortieth Annual Meeting in New York City at the Waldorf-Astoria on June 28-July 2, the first to be held in New York in the past twenty-five years. The meeting was opened on Monday, June 28, with a formal address by A. C. Fieldner, the retiring president, with committee meetings held all week. In addition to these sessions, the meeting was marked by the usual display of testing instruments.

The Committee on Rubber Products (D-11) met on Wednesday, although various sub-committees rendered reports to other interested committees on both Monday and Tuesday as well. In all, reports were heard from sub-committees for mechanical hose, protection from electric shock, insulated wire and cable, physical testing, chemical analysis, abrasion tests, life tests, vibration absorption, adhesion tests and liquid rubber products. Further details of these reports will appear in an early issue.

A Symposium on Consistency, which included critical discussion on present-day practices in consistency measurement, was held on Tuesday, June 29, at which J. H. Dillon and L. V. Cooper, of the Firestone Tire and Rubber Company, delivered a paper on "Consistency Measurement of Rubber and Rubber Compounds." A paper on the "Definition of Consistency and Theoretical Considerations" was also given at this session by M. Mooney of U. S. Rubber Products, Inc., who is also president of the Society of Rheology.

Rubber Testing Machines

A number of testing devices for use in the rubber industry were exhibited in various booths on the exposition floor of the Waldorf-Astoria. The Henry L. Scott Company, Providence, R. I., exhibited their rubber tensile tester, a light capacity incline plane tester, a cord tester of the incline plane type, a tensile elongation tester for wire, cord and other like materials, in addition to other small testing apparatus. Both David C. Scotts, Senior and Junior, were in attendance at the booth.

Precision measuring instruments, including the recently announced Model 2 Test Indicator, were on display at the booth of the Federal Products Corporation, Providence, R. I. Gages for height, depth, caliper and other measurements were shown. Representatives included O. S. Mitler and F. C. Tanner. A wide variety of instruments were shown by the C. J. Tagliabue Manufacturing Company, Brooklyn, N. Y., including the new Celectray potentiometer pyrometers for indicating, recording and controlling temperature. The Louis Schopper line of instruments, for rubber, plastics and other industries, was displayed at the booth of Testing Machines, Inc., New York City.

Other displays of interest to the rubber trade were those of the Illinois Testing Laboratories, Inc., Chicago, where J. H. Torrey was in charge, and that of Atlas Electric Devices Company, Chicago. In the former, the company's line of Alnor and Price indicating pyrometers were shown, as well as a new automatic temperature controller which has recently been developed, while the latter concern displayed its Weather-Ometer and Fade-Ometer devices, both of which represented the latest available models. C. W. Jameson, president of Atlas, was in attendance at the booth, in addition to other representatives.

Displays were also maintained by the Amthor Testing Instrument Company, Inc., Brooklyn, N. Y., which included vertical and horizontal tensile strength testers, and by the Baldwin-Southwark Corporation, Philadelphia. At this booth was exhibited the Rayflex vibration testing machine, a new development built by the Raytheon Company and devised by Dr. A. V. de Forest of M. I. T.

The Cambridge Instrument Company, New York, represented by C. W. Campbell and K. P. Royce, was on hand with its line of mechanical and electrical precision testing instruments, including pyrometers, while the Emerson Apparatus Company, with C. J. Emerson and others in attendance, showed its oxygen bomb and rubber buffing machines. Still other exhibits of interest to rubber technologists were those maintained by the Leeds and Northrup Company and the Tinius Olsen Testing Machine Company.

The new officers of the Society were announced during convention week. They include: A. E. White, director, Department of Engineering Research, University of Michigan, as president; H. H. Morgan, manager, Rail and Track Fastenings Dept., Robert W. Hunt Co., as vice-president; and P. H. Bates, G. E. F. Lundell, H. F. Clemmer, H. C. Mougey and R. L. Templin, as members of the executive committee.

Back Copies Wanted

The Institut Francais du Caoutchouc (the French Rubber Institute), of Paris, France, is anxious to acquire a complete file of back copies of THE RUBBER AGE (New York) and has asked this journal to request the cooperation of its readers to that end. Therefore, subscribers who may have back copies available will earn the appreciation of the Institute if they will forward such copies to THE RUBBER AGE, 250 West 57th Street, New York City, so that we, in turn, can forward them to the Institute in France.

Continental Tank Cars

Continental Carbon Company, latest entrant into the field of carbon black manufacturers, with a 160-acre plant at Sunray, Texas, has ordered several specially-constructed tank cars. These cars are loaded at the top and have special unloading hoppers through which the black is released into conveyors at the customer's factory.

BROCKTON TOOL HAS 25th ANNIVERSARY

The Brockton Tool Company, Brockton, Massachusetts, manufacturer of molds for all purposes, is celebrating its 25th anniversary this year. The company was founded in August, 1912, by Levi Holmes and John Sandberg, when the rubber heel and sole industry was in its infancy. Starting with the manufacture of heel and sole molds, the company has kept progress with the rapid strides made by this division of the rubber industry.

In 1928, one of the founders, John Sandberg, was drowned in the Moosehead Lake tragedy. Shortly thereafter the company was incorporated with Mr. Holmes as president and treasurer. In November, 1929, Herbert H. Wydom, mold engineer for the Hood Rubber Company, joined Brockton Tool. Today Mr. Wydom is president, Levi Holmes is treasurer, and Gilbert W. Holmes is secretary.

During the past few years the company has broadened its activities to include the manufacture of all types of molds used in the rubber and other industries. It includes among its customers many of the leading rubber manufacturers in the United States, Canada and Central and South America. It has always maintained its policy of producing quality mold equipment, according to Levi Holmes, and has earned an enviable reputation in its twenty-five years.

FREUNDLICH GIVES TALK ON THIXOTROPY

Dr. Herbert Freundlich, noted colloidal chemist of the University of London, who came to this country recently to speak before a colloid symposium held in Minneapolis, was the chief speaker of the combined annual Spring meeting of the Dayton, Columbus and Cincinnati Sections of the American Chemical Society, held on June 5 at Antioch College, Yellow Springs, Ohio.

Selecting thixotropy as the subject of his first lecture in the United States, Dr. Freundlich spoke of the gels which change their consistency upon agitation and stated that thixotropic substances seem to be in a state intermediate between a freely flowing colloidal suspension and a powder. He pointed out that a common example of the principle of thixotropy, the commercial applications of which include the manufacture of rubber, paint and petroleum products, is seen in the phenomenon of quicksand, an apparent solid which flows on agitation.

Thixotropy may also operate in protoplasm, according to Dr. Freundlich, and consequently in muscular activity. While there is some evidence that protoplasm is a thixotropic substance, the part played by thixotropy in muscular activity so far is only a suggestion. The lecture was supplemented with slides and with numerous specimens of thixotropic substances.

OBITUARIES

Sir Eric Geddes

Sir Eric Geddes, chairman of the Dunlop Rubber Company, Ltd., Imperial Airways, Ltd., and of fourteen other companies, died at his home, Albourne Place, Hassocks, Sussex, England, on June 22, at the age of 61.

Sir Eric was born in India and attended schools in Scotland. At an early age he ran away to the United States where he worked at various occupations, including logging, braking, working in a steel mill and doing odd jobs in sawmills and lumber yards. Returning to England before he reached maturity, Sir Eric shortly thereafter left for India where he became superintendent of a small railway. His work soon caught the attention of railway leaders and he was brought back to England to work for the Northeastern Railway Company of Great Britain. When the War broke out in 1914 Sir Eric helped transfer all British railways to government control and in 1915 was appointed Deputy Director of Munitions. From this point on he held a number of important government jobs in succession, serving as First Lord of the Admiralty during 1917-18. It was Sir Eric who led the fight against the use of submarines by Germany. He was knighted in 1916. In 1921 he became chairman of the famous Economy Committee of Great Britain and wielder of the equally-famous "Geddes Axe." Sir Eric joined the board of directors of the Dunlop Rubber Company in 1922 and was elected chairman shortly thereafter. He leaves a widow and three sons.

John P. Flynn

John P. Flynn, comptroller and assistant treasurer of the Guerin Mills, Woonsocket, Rhode Island, and for seven years a tax expert in the employ of U. S. Rubber Products, Inc., died on July 5 in the Park East Hospital, New York City, after an operation to remove stomach ulcers. He was thirty-six year of age. Mr. Flynn was graduated from the School of Commerce, Accounts and Finance of New York University and was captain of the N. Y. U. baseball team in 1923. After his graduation he retained his interest in baseball and organized an alumni team which played the varsity each Spring. Since 1932 he was president of the New York University Letter Club, an organization of alumni who had received letters for athletic prowess. In 1935 he was awarded the University's alumni meritorious medal. Mr. Flynn joined U. S. Rubber in the control department in 1929 and left about a year ago to join the Guerin Mills. He was married only a few weeks before his death. In addition to his widow he leaves his parents, three brothers and two sisters.

W. T. Teagan

W. T. Teagan, one of the first sales representatives in the tire field, died early last month in Boston, Mass. Mr. Teagan entered the sales end of the tire business before the turn of the century and helped to introduce the use of rubber tires on carriages. In 1900 he convinced F. A. Seiberling to send him to Boston to introduce rubber tires throughout New England and started the Boston branch of the Goodyear Tire and Rubber Company. Before he retired from active participation in business in 1923 because of ill health, Mr. Teagan had erected a five-story building to carry on the distribution of Goodyear tires in New England.

George F. Armstrong

George F. Armstrong, one-time president of the old Armstrong Rubber Company located at Garfield, N. J., died on June 30 at his summer home at Lake Hopatcong, N. J., at the age of 67. Death was due to a heart ailment. Mr. Armstrong at one point in his career managed the Adams Hotel in New York City. He was a director of the Lake Hopatcong Yacht Club and for many years was a member of that club's board of directors. He leaves a widow.

D. Walter Thomas

D. Walter Thomas, brother of John W. Thomas, president of the Firestone Tire and Rubber Company, died at his home, 361 Lindenwood Avenue, Akron, on June 23, at the age of 58, after an illness of several months. Mr. Thomas was born at Tallmadge, Ohio, in 1879, where interment took place. He leaves a widow, two sons, and a daughter.

Frederick J. Maywald

Frederick J. Maywald, noted consulting rubber chemist of Carlstadt, N. J., died at his home in Rutherford, N. J., on July 3, after an illness of a few days. Born in New York City on June 25, 1870, Mr. Maywald was graduated from Cooper Union in 1888 and took a post graduate course in 1890. In 1895-96 he was a special student at the Brooklyn Polytechnic Institute and shortly thereafter entered the chemical industries field as a consulting chemist. For many years he was associated with the late Dr. Peter T. Austin and later succeeded Dr. Austin as a leader in the development of processes for the treatment of crude rubber. Mr. Maywald was the first secretary of the Rubber Division, A.C.S., and a past president of the Cooper Union Chemical Society. He held more than twenty patents on various processes in the rubber and other fields. In 1910 he served as chairman of the Municipal Explosives Committee of New York City. A few years prior to that date he helped open phosphate mines near Tampa, Florida. Mr. Maywald was interested in the Boy Scout movement and at one time served as scoutmaster of Troop 33 in Brooklyn, N. Y. He was an active Mason and Shriner, and was a member of the American Chemical Society, American Society for Testing Materials, Society of Chemical Industries, and other technical organizations. He leaves a widow, two sons and a daughter.

Myron D. Ettla

Myron D. Ettla, representative in charge of wholesale sales for the Servus Rubber Company, died on June 18 in St. Anthony's Hospital, Rock Island, Illinois, at the age of 45. Death was due to a stomach ailment and ensuing complications. Born in Milton, Pennsylvania, on April 7, 1892, Mr. Ettla was graduated from the Milton High School and enrolled in Bucknell University for a pre-medical course. Attracted to business, however, he joined the Elliott-Fisher Company and went to Rock Island in 1911 to represent the company as manager of its branch office. Joining the army toward the close of the World War he was honorably discharged as a corporal in March, 1919, and returned to Rock Island. Mr. Ettla started with the Servus Rubber Company, which began the manufacture of rubber and canvas footwear in April, 1923, from its inception. For many years he held the position of advertising and sales manager and was appointed to head the wholesale sales division when Eastern interests acquired and reorganized the company last year. Mr. Ettla was an outdoor sports enthusiast, fishing and hunting being his favorite pursuits. He was a member of the Hancock Slough Hunting Club, while his constant fishing companion was the noted Cal Johnson, leading fishing authority. He was a member of the American Legion and also of the Rock Island lodges of the Elks and Masons.

NEW ENGLAND NEWS

Labor strife developed at several points in Connecticut's rubber industry during June, with undercurrents of union organization felt in many plants where no demands had yet been formulated or other outward manifestation seen. The Committee for Industrial Organization claimed majorities in several factories.

Actual violence occurred only at the plant of the Duro Gloss Rubber Company, New Haven, where 90 employees, members of the United Rubber Workers of America, CIO affiliate, struck for increased wages, shorter hours and a closed shop. The walkout on June 29 followed an unproductive conference between union representatives and Harry E. H. Cox, company president.

On the following day, J. C. Ramstedt, plant superintendent, and his son, Carl, were roughly handled by pickets when they attempted to drive into the factory grounds with two auto-loads of workers. Edward T. Geenty, president of the union, was arrested on a charge of intimidation and five other strikers were held for breach of the peace. A cordon of police was stationed at the factory to supervise the activities of the 24-hour picket line.

The strikers demanded a 40-hour week, time and a half for overtime, a wage increase of 10 cents an hour, and the closed shop. Under the present scale, machine operators are said to receive 50 cents an hour, and helpers 40 cents. President Cox characterized the closed shop demand as the chief obstacle to settlement. The plant employs 140 and of this number about one-third refused to join the strike. The company attempted to continue production with those remaining.

Employees of the Naugatuck Chemical Division of U. S. Rubber Products, Inc., Naugatuck, Conn., voted to strike on June 18, but the strike was outlawed by S. H. Dalrymple, international president of the U. R. W. A., and an agreement was reached with the management on June 25.

The June 25th conference found John E. Caskey, general manager, Cy Ching and Mr. Friedman of U. S. Rubber, conferring with union representatives. A wage adjustment was decided upon, applying to all employees, although the amount was not made public. Terms of the agreement were ratified at a mass meeting of employees the same night. Union officials opposed any strike throughout the negotiations, declaring they felt more could be accomplished by peaceful means.

Local 11, United Rubber Workers of America, has ratified an agreement with the Fisk Rubber Corp., Chicopee Falls, Mass., providing for a wage increase of 5 per cent, one week's vacation with pay for all employees, and other undisclosed conditions. The agreement is effective for one year beginning July 6, and was reached after conferences covering a period of four months. The agreement is the first written one to be signed by the union and the Fisk management. The wage increase is the second to be granted within the last eight months, an 11 per cent boost having become effective last November. The vacation program is effective for employees with more than six months' service.

The Waterbury Brass Workers Union, CIO affiliate, has organized several plants in Connecticut's "Brass City," including the Shoe Hardware Company, a subsidiary of U. S. Rubber Products, Inc. Conferences were scheduled to determine demands and means of negotiation.

The U. R. W. A. has also been active in other rubber manufacturing areas. A meeting of plant workers was sponsored by this union in Seymour, Conn., where are located the plants of Kerite Insulated Wire & Cable Company and the H. P. & E. Day Company. The latter concern manufactures fountain pens and hard rubber specialties.

The same union was defeated in its effort to organize the Fairfield, Conn., plant of E. I. du Pont de Nemours & Company, when an official poll revealed the preference of workers for the Employees' Works Council as representatives instead of the U. R. W. A. by a vote of 265 to 45.

The CIO was successful in obtaining exclusive bargaining rights for employees of the Bridgeport plant of the General Electric Company when a poll supervised by the National Labor Relations Board showed the employees preferred CIO representation as against an independent union of General Electric employees.

Jenkins Bros., Bridgeport, Conn., is starting construction of a steel and frame addition to its present plant, to cost about $1,200.

More than 5,000 employees of the Naugatuck footwear plants of U. S. Rubber Products, Inc., are having their first vacation with pay this Summer. The plants were to be shut down from July 3 to July 19 for inventory and overhauling of machinery and each employee received one week's vacation with pay. The total disbursement amounted to approximately $90,000. A mammoth outing for the rubber workers is planned later in the Summer at Lake Quassapaug, Middlebury.

Two substantial contracts were received by U. S. Rubber Products, Inc., from the Federal government recently. One was from the Quartermaster Corps, U. S. Army, for 9,770 pairs of laced rubber boots at $2.99 per pair, and the other was for $29,543.86 for rubber boots to be used by the Civilian Conservation Corps. The company will play host to more than 270 of its salesmen on July 26 and 27, with representatives coming to Naugatuck from all parts of the United States. Several banquets and a picnic are planned.

Gold service pins denoting 25 years of employment with the concern were presented to 125 employees of Farrel-Birmingham, Inc., Ansonia, Conn., at a testimonial dinner June 17 at Hollywood Inn, Ansonia. Franklin Farrel, Jr., made the presentations; Nelson W. Pickering, president, was toastmaster; and the guest speaker was James W. Hook, president of the Geometric Tool Company, New Haven.

Whitney-Blake Company, Hamden, Conn., insulated wire, is altering its capital structure by increasing its capital to 50,000 shares having par value of $5 each, with total authorized capitalization increased to 200,000 shares of $5-par value. To accomplish this, the company is adding 1,289 shares and 211 shares, both lots of $100-par value.

TRENTON NEWS

Employees of the Vulcanized Rubber Company, Morrisville, Pennsylvania, have organized a union and affiliated it with the United Rubber Workers of America. The new union has leased quarters near the plant but as yet has not presented any demands to the company.

The Joseph Stokes Rubber Company and the Puritan Rubber Company, both of Trenton, recently laid off some employees because of a slackening of orders. Other Trenton companies are operating normally, many of them increasing working hours.

New Jersey's State Tax Appeal Board has reduced the assessment of the Murray Rubber Realty Holding Corporation, Trenton, from $231,000 to $88,900. The plant was sold to the realty company after the rubber concern failed.

A West New York, N. J., firm has leased a portion of the plant of the Michelin Tire Company at Milltown, N. J. Michelin ceased operations at the plant several years ago.

Last Call for Copy

The closing date for advertising forms on the 1937 RUBBER RED BOOK Directory has been extended to July 30. Prospective advertisers are urged to have copy in prior to that date to insure insertion.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, JULY 8, 1937

Crude Rubber

CRUDE rubber prices climbed steadily during the month of June since our last report from a low for the period of 18.52 for spot on the Exchange on June 10 to 19.60 on June 18, and then after a slight recession, came back to 19.56 on June 25. Absorption of futures by factory and trade interests was responsible for the upward trend plus the rumor that government intercession in domestic labor difficulties was imminent. Dropping again to 19.28 on June 30, because of waning factory interest, the price suddenly jumped 35 points on July 1, speculative buying apparently being encouraged by bullishly interpreted shipment figures for May. With factories again reluctant to follow the trend, the price has been dropping steadily in the past few days. Higher prices, however, are anticipated in the immediate future based on the assumption that shipments from signatory countries will fall below the quotas for the balance of the year. The trade is intently watching the world available stock position. Quotations in the outside market, Exchange, London and Singapore, follow:

As of July 8

Plantations—

Ribbed Smoked Sheets—			
No. 1 Spot	—	@	.19⅜
July-September	—	@	.19⅛
October-December	—	@	.19⅜
No. 2	—	@	.19⅛
No. 3	—	@	.18⅞
No. 4	—	@	.18⅝
Thin Latex Crepe	—	@	.21½
Thick Latex Crepe	—	@	.21¾
Brown Crepe, No. 1	—	@	.18
Brown Crepe, No. 2	—	@	.17⅞
Amber Crepe, No. 2	—	@	.18
Amber Crepe, No. 3	—	@	.17⅞
Amber Crepe, No. 4	—	@	.16⅞
Brown Crepe, Rolled	—	@	.15

Latex—

Liquid Latex, per gal.	.70	@	.71

Paras—

Up-River, fine	—	@	.20
Acre Bolivian, fine	—	@	.20¼

Balata—

Block, Ciudad	—	@	.30

LONDON MARKET

Standard Smoked Sheets—Buyers—July 8			
October-December	—	@	9 1/16d
January-March	—	@	9 3/16d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—July 8			
October-December	—	@	9 1/16d
January-March	—	@	9 3/16d

Reclaimed Rubber

Most reclaimers report that they are still operating their plants at capacity. Expansion programs have been instituted by several reclaimers who see no signs of the demand slackening up for the next few months. It has just been established that the potential capacity of reclaim plants in this country is well above any estimated annual demand for the next several years. There has been no change in the price situation since our last report. Current quotations follow:

Shoe

Unwashed, lb.	.07	@	.07¼
Washed, lb.	.10	@	.10½

Tube

No. 1 (Floating), lb.	.19	@	.19¼
No. 2 (Compounded), lb.	.10½	@	.11
Red tube, lb.	.10½	@	.11

Tires

Black (acid process), lb.	.07¼	@	.07½
Black, selected tires, lb.	.06¼	@	.06½
Dark Gray, lb.	.10	@	.10½
White, lb.	.15	@	.15½
Truck, Heavy Gravity, lb.	.06½	@	.07
Truck, Light Gravity, lb.	.08	@	.08½

Miscellaneous

Mechanical blends, lb.	.04½	@	.05

Scrap Rubber

(Delivered Akron Mills)

Dealers report the market rather dull although demands from reclaimers continue at a high rate. Prices have been raised slightly on clean solid truck tire grade since our last report, and have dropped on inner tubes (*No. 2*) and red grades. The market is reacting to the usual Summer condition. Current quotations follows:

(Prices to Consumers)

Auto tire peelings, ton	23.50	@	25.00
Mixed auto, ton	14.50	@	15.00
Beadless tires, ton	19.00	@	20.00
Clean solid truck tires, ton	29.00	@	31.00
Boots and shoes, ton	22.50	@	25.00
Arctics, untrimmed, ton	17.50	@	21.50
Inner tubes, No. 1, lb.	.12	@	.13
Inner tubes, No. 2, lb.	.06⅛	@	.06¼
Inner tubes, Red, lb.	.06⅛	@	.06¼

Cotton

Cotton prices have moved in a narrow range since our last report with both buyers and sellers acting cautiously, the buyers because of the fact that the current crop outlook remains above normal and the sellers because industrial and political conditions are more likely to improve than become any worse than they have been in recent months. The market took its first real spurt in a month today (July 8) when the Crop Reporting Board of the Department of Agriculture announced its estimate of the acreage under cultivation in cotton as of July 1, *i.e.*, 34,192,000 acres, which represents a 10.4% increase over acreage planted as of the same date one year ago. The price jumped from 12.62 to 12.85. The lowest quotation in the past thirty-day period was 12.36 on June 14. Consumption seems to be in need of considerable stimulation and the market fears adverse effects if labor troubles continue. Quotations for middling uplands on the N. Y. Cotton Exchange follow:

	June 9	July 8		
	Close	High	Low	Close
July	11.99	12.25	12.00	12.25
September	12.19	12.31	12.31	12.31
December	11.99	12.30	12.00	12.29

Tire Fabrics

(Prices Net at the Mill)

Peeler, carded, 23/5/3, lb.	.34½	@	.34¾
Peeler, carded, 23/4/3, lb.	.35½	@	.35¾
Peeler, carded, 15/3/3, lb.	.32½	@	.32¾
Peeler, carded, 13/3/3, lb.	.31½	@	.31¾
Egyptian, carded, 23/5/3, lb.	.48¼	@	.48½
Egyptian, combed, 23/5/3, lb.	.53¼	@	.53½
CHAFERS			
Carded, American, 1 1/16", lb.	.33¾	@	.34¼
Carded, American, 1", lb.	.29¾	@	.33¼

Sheetings

48x40	36 in.	5.50	lb.	— @	.05½
40x40	36 in.	6.15	lb.	— @	.05
40x36	36 in.	6.50	lb.	— @	.04½
48x48	40 in.	2.50	lb.	— @	.11¼
48x48	40 in.	2.85	lb.	— @	.09½
56x60	40 in.	3.60	lb.	— @	.09½
48x44	40 in.	3.75	lb.	— @	.08½
44x40	40 in.	4.25	lb.	— @	.07

Ducks

Enameling (single filling), lb.	.30	@	.33
Belting and Hose, lb.	.30	@	.31
Single filling, A grade, lb.	—	@	.15
Double filling, lb.	—	@	.16

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 tons

FROM JUNE 10 TO JULY 8

Date		Spot	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Sales
June	10	18.52	18.50	18.53	18.60	18.68	18.71	18.74	18.77	18.82	18.85	18.88	18.93	18.98		326
	11	18.75	18.72	18.75	18.83	18.90	18.94	18.97	19.01	19.04	19.07	19.11	19.17	19.21		202
	12	—	—	—	—	—	—	—	—	—	—	—	—	—		—
	13	—	—	—	—	—	—	—	—	—	—	—	—	—		—
	14	18.80	18.79	18.82	18.87	18.93	19.00	19.03	19.06	19.09	19.12	19.16	19.21	19.26		135
	15	19.25	19.17	19.20	19.27	19.34	19.38	19.41	19.45	19.49	19.53	19.57	19.62	19.67		409
	16	19.22	19.17	19.21	19.28	19.36	19.40	19.45	19.50	19.53	19.56	19.60	19.64	19.68		214
	17	19.35	19.33	19.36	19.43	19.50	19.54	19.58	19.60	19.65	19.69	19.72	19.76	19.80		333
	18	19.60	19.58	19.61	19.68	19.75	19.80	19.85	19.88	19.92	19.95	19.98	20.03	20.08		361
	19	—	—	—	—	—	—	—	—	—	—	—	—	—		—
	20	—	—	—	—	—	—	—	—	—	—	—	—	—		—
	21	19.44	19.37	19.40	19.48	19.57	19.62	19.66	19.70	19.75	19.80	19.85	19.90	19.95		310
	22	19.28	19.28	19.31	19.38	19.46	19.52	19.57	19.62	19.67	19.72	19.77	19.82	19.87		208
	23	19.18	19.13	19.16	19.25	19.35	19.40	19.45	19.48	19.54	19.59	19.64	19.69	19.74		234
	24	19.53	19.48	19.50	19.61	19.71	19.76	19.81	19.86	19.91	19.96	20.00	20.07	20.14		305
	25	19.56	19.55	19.58	19.67	19.76	19.82	19.88	19.93	20.00	20.06	20.12	20.19	20.26		532
	26	—	—	—	—	—	—	—	—	—	—	—	—	—		—
	27	—	—	—	—	—	—	—	—	—	—	—	—	—		—
	28	19.18	—	19.17	19.27	19.38	19.45	19.52	19.57	19.64	19.68	19.74	19.80	19.86		469
	29	19.18	—	19.15	19.26	19.37	19.44	19.50	19.55	19.62	19.67	19.72	19.80	19.89		387
	30	19.28	—	19.26	19.35	19.44	19.50	19.56	19.62	19.70	19.75	19.80	19.87	19.94		205
July	1	19.63	19.65	19.74	19.83	19.88	19.92	19.97	20.02	20.06	20.10	20.17	20.24	20.30		543
	2	19.38	19.33	19.42	19.51	19.56	19.61	19.66	19.72	19.77	19.83	19.90	19.97	20.03		269
	3	—	—	—	—	—	—	—	—	—	—	—	—	—		—
	4	—	—	—	—	—	—	—	—	—	—	—	—	—		—
	5	—	—	—	—	—	—	—	—	—	—	—	—	—		—
	6	19.37	19.32	19.39	19.49	19.55	19.59	19.63	19.70	19.75	19.81	19.88	19.95	20.01		197
	7	19.18	19.15	19.22	19.30	19.36	19.42	19.46	19.53	19.59	19.65	19.72	19.79	19.85		326
	8	19.21	19.16	19.25	19.34	19.39	19.44	19.49	19.55	19.61	19.67	19.74	19.81	19.87		182

Rubber CHEMICAL Markets

NEW YORK, JULY 10, 1937

[All Quotations F.O.B. Works Unless Otherwise Noted]

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.24 @	.28
A-5-11	lb.	.33 @	.36
A-7	lb.	.53 @	.65
A-11	lb.	.60 @	.75
A-16	lb.	.55 @	.65
A-19	lb.	.56 @	.75
A-32	lb.	.70 @	.80
A-77	lb.	— @	—
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.	— @	—
Captax	lb.		
Crylene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.44 @	.47
Diphenylguanidine	lb.	.35 @	.37
El-Sixty	lb.	.55 @	.65
Ethylidene aniline	lb.	.45 @	.47½
Formaldenyde aniline	lb.	.37½ @	.42
Guantal	lb.	.42 @	.51
Heptene	lb.	.40 @	—
Hexamethylenetetramine	lb.	.36 @	—
Lead Oleate, No. 999	lb.	.12 @	—
Witco	lb.	.12 @	—
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.36 @	.37
Monex	lb.	3.25 @	—
Oxynone	lb.	.68 @	.80
Phenex	lb.	.50 @	.55
Pipsolene	lb.	1.60 @	1.85
R & H 40	lb.	.40 @	.41
R & H 50	lb.	.40 @	.41
R-2	lb.	1.50 @	1.80
Safex	lb.	1.20 @	1.25
SPDX	lb.	.75 @	—
Super-Sulphur No. 1	lb.		
No. 2	lb.		
Thiocarbanilid, drums	lb.	.24 @	.28
Trimene	lb.	.75 @	—
base	lb.	1.20 @	—
Triphenylguanidine	lb.	.58 @	.60
Tuads	lb.		
Ureka	lb.	.62 @	1.00
Ureka B	lb.	.62 @	.75
Ureka C	lb.	.58 @	.69
Vulcanex	lb.		
Vulcone	lb.		
Vulcanol	lb.		
Z-88-P	lb.	.48 @	.60
Zimate	lb.		
Inorganic			
Litharge, domestic	lb.	.07½ @	.08½
Magnesia, calcined, heavy	lb.	.04 @	—

COLORS

Blacks (See Compounding Materials)

Blues			
Prussian	lb.	.36 @	.37
Ultramarine	lb.	.15 @	—
Browns			
Mapico	lb.	.13 @	—
Umber, Turkey	lb	.04 @	.04½
Greens			
Chrome	lb.	.21 @	—
Chromium Oxide, bbl.	lb.	.21 @	—
Guignet's Green	lb.	.70 @	—
Reds			
Antimony			
crimson, 15/17	lb.	.48 @	—
sulfur, free	lb.	.48 @	.60
Indian English	lb.	.09 @	.10
Domestic (Maroon)	lb.	.11 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red, f.o.b. Easton	lb.	.09¼ @	—
Whites			
Cryptone, No. 19	lb.	.05⅞ @	.06⅛
Cryptone CB, No. 21	lb.	.05⅞ @	.06⅛
Cryptone, ZS-20	lb.	.09 @	.09½
Cryptone, ZS-86	lb.	.09 @	.09½
Lithopone			
Albalith, black label—11 lb.		.04⅜ @	.04⅝
Azolith	lb.	.04⅜ @	.04⅝
Rayox	lb.		
Titanox A	lb.	.16 @	.16¾
Titanox B	lb.	.05⅞ @	.06⅛
Titanox C	lb.	.05⅞ @	.06⅛
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.06¼ @	.06½
Anaconda, lead free	lb.	.06¼ @	.06½
Horsehead Lead Free Brand:			
Special—3	lb.	.06¼ @	.06½
XX Red—4	lb.	.06¼ @	.06½
XX Red—72	lb.	.06¼ @	.06½
XX Red—78	lb.	.06¼ @	.06½
XX Red—103	lb.	.06½ @	.06¾
Kadox, black label—15	lb.	.06½ @	.06¾
Blue label—16	lb.	.06½ @	.06¾
Red label—17	lb.	.06½ @	.06¾
St. Joe, black label	lb.	.06¼ @	.06½
green label	lb.	.06¼ @	.06½
red label	lb.	.06¼ @	.06½
U. S. P.—7, bbls.	lb.	.09 @	.09¼
Zinc Oxide—French Process			
Florence White seal—7 bbls.	lb.	.08½ @	.08¾
Green seal—8	lb.	.08 @	.08¼
Red seal—9	lb.	.07½ @	.07¾
Yellows			
Chrome	lb.	.14½ @	.15½
Mapico	lb.	.09½ @	—

BLACKS

Arrow "Aerfloted" Specification	lb.	.0535 @	.0825
Bone, powdered	lb.	.05½ @	.12½
Carbon, compressed	lb.	.0535 @	.0825
uncompressed	lb.	.0535 @	.0825
"Certified," Cabot	lb.	.0535 @	.0825
Spherons	lb.	.0535 @	.0825
"Disperso"	lb.	.0535 @	.0825
Drop, bbls.	lb.	.05½ @	.14
"Excello," compressed	lb.	.0535 @	.0825
"Fumonex"	lb.	.03 @	.07
"Gastex"	lb.	.03 @	.07
Lampblack	lb.	.07 @	.12
"Micronex"	lb.	.0535 @	.0825
"Supreme"	lb.	.0535 @	.0825
Thermatomic—"P 33"	lb.	— @	—
"Thermax"	lb.	— @	—
United "Dixie" & "Kosmos"	lb.	.0535 @	.0825

COMPOUNDING MATERIALS

Aluminum Flake	ton.	21.85 @	24.50
Ammonia carbonate, lump	lb.	.10½ @	.12
Asbestine	ton	13.00 @	15.00
Barium carbonate (98-100%)	ton	56.50 @	62.50
Barium Dust	lb.	.05 @	.06
Barytes	ton	23.65 @	31.15
Basofor	lb.	.04½ @	—
Bentonite	lb.	.02 @	.03
Blanc fixe dry f.o.b. works	ton	60.00 @	65.00
Calcene	ton	37.50 @	45.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	45.40 @	60.00
heavy	ton	45.00 @	55.00
Clay, Kaolin, domestic	ton	7.50 @	15.00
Aerfloted, Suprex	ton	9.00 @	21.00
Congaree	ton	9.00 @	—
Dixie	ton		
Dixie, Jr.	ton		
McNamee	ton		
Par	ton		
Tensulite		15.00 @	—
Witco	ton	8.50 @	9.00
Cotton Flock	lb.	.11 @	.15
Glues, extra white	lb.	.28 @	.30
medium white	lb.	.14 @	.19
Kalite No. 1	ton	30.00 @	55.00
Kalite No. 3	ton	40.00 @	65.00
"Lime Crest" Industrial Filler No. 100	lb.	— @	—
Magnesium carbonate	lb.	.07 @	.09
Mica	ton	35.00 @	44.00
Pyrax A	ton	— @	—
Rottenstone (powdered)	lb.	.02½ @	.05
Soapstone, powdered	ton	16.00 @	22.00
Starch, powdered	cwt.	2.90 @	4.10
Talc, domestic	ton	17.00 @	20.00
Whiting, commercial	ton	17.00 @	18.00
Columbia Filler	ton	9.00 @	14.00
English Cliffstone	ton	33.00 @	43.00
Witco	ton	7.00 @	—
Wood Flour	ton	20.00 @	25.00
Zinc Carbonate	lb.	— @	.11½
Zinc Stearate	lb.	.20 @	.23

MINERAL RUBBER

Black Diamond	ton	27.00 @	—
Genasco, solid (factory)	ton	25.00 @	27.00
Hard Hydrocarbon	ton		
Parmr, solid	ton	25.00 @	—
Pioneer, MR, solid	ton		
Pioneer-granulated	ton		

SPECIALTIES

Aromatics—Rodo	lb.		
Para-Dora No. 5145	lb.	2.00 @	—
Sunproof	lb.	.35 @	.37½
Sponge Paste	lb.	— @	.80
Tonox	lb.	.56 @	.60

SOFTENERS

Acids			
Acetic, 28%, bbls.	100 lb.	2.53 @	2.78
Nitric, 36 degrees	cwt.	5.00 @	6.00
Sulfuric, 66 degrees	ton	15.50 @	16.50
Acids, Fatty			
Laurex	lb.	15 @	.16
Stearex Beads	lb.	.10¾ @	.11¾
Stearic, double pressed	lb.	.12½ @	.13½
Stearite	lb.	.10½ @	.11¾
Alkalies			
Caustic Soda, 76%	cwt.	3.05 @	4.25
Soda Ash, 58% C.L.	cwt.	1.25 @	3.05
Oils			
Cycline Oil	gal.	.20 @	—
Degras, bbls.	lb.	.07¾ @	.08
Fluxrite	lb.	.05½ @	.06½
Palm Niger	lb.	.05½ @	.06½
Para-Flux	gal.	.17 @	—
Petrolatum, light	lb.	.03⅛ @	.03⅜
Pigmentaroil, tank cars	gal.	.16 @	—
in drums	gal.	.22½ @	.23½
Pine, steam distilled	gal.	.64 @	.69
dest. dist., drums	gal.	.49 @	.50
Rosin Oil, cmpd	gal.	.40 @	—
Rubberol, f.o.b. Chicago	lb.	.13½ @	.14
Rubtack	lb.	.08 @	.10
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	.07 @	—
Witco Softener	gal.	.18 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Wobonite, c.l.	lb.	.05 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.05½ @	.06½
coal tar	ton	19.00 @	22.00
hardwood	ton	16.00 @	22.50
pine, 200 lb. gr. wt.	bbl.	6.00 @	6.50
Pigmentar, tank cars	gal.	.16 @	—
in drums	gal.	.22½ @	.23½
R. S. I. Resin	lb.	— @	—
Retort Pine Tar, drums	ton	20.00 @	26.00
Solvents			
Acetone, pure	lb.	.06 @	.06½
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.33 @	.39
Benzene, 90%	gal.	.18 @	.23
Beta-Trichlorethane	gal.	— @	—
Bondogen	lb.	— @	—
Carbon, bisulfide	lb.	.05¼ @	.08
Carbon, tetrachloride	lb.	.05¾ @	.08
Dichlorethylene	lb.	.29 @	—
Dipentene, cml., drums	gal.	.41 @	.50
Dryolene (f.o.b. Okla.)	gal.	.10 @	.10½
Ethylene dichloride	lb.	.05½ @	.06½
Plastogen	lb.		
Reogen	lb.		
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Trichlorethylene	lb.	— @	.09½
Turpentine, spirits	gal.	.43 @	.47
dest. dist., drums	gal.	.33 @	.41
Waxes			
Beeswax, white	lb.	.39 @	.45
Carnauba, yellow	lb.	.46 @	.47½
Ceresin, white, dom.	lb.	.08 @	.11
Montan, crude	lb.	.10¾ @	.11¾
Paraffin (c.l.—f.o.b. N. Y.)			
Yellow crude scale	lb.	.02¾ @	—
White crude scale 124/126	lb.	.02¾ @	.03
Refined, 122/127	lb.	.04½ @	—

ANTI-OXIDANTS

AgeRite, Gel	lb.		
HP	lb.		
Powder	lb.		
Resin	lb.		
White	lb.		
Albasan	lb.	.70 @	.75
Antox	lb.		
B-L-E	lb.	.57 @	.60
Flectol-H	lb.	.54 @	.65
Flectol White	lb.	.95 @	1.15
Flectol B	lb.	.54 @	.65
Neozone	lb.		
Oxynone	lb.	.66 @	.75
Perfectol	lb.	.67 @	.75
Retardex	lb.	.35 @	.40
Santoflex A	lb.	— @	—
Stabilite	lb.	.57 @	.62
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.55 @	.60

MOLD LUBRICANTS

Aresklene	lb.	— @	—
Cocoa Soapstock	lb.	.06 @	.08
Dipex	lb.	.06 @	.08
Lubrex	lb.	.25 @	.30
Rubberol, f.o.b. Chicago	lb.	.13½ @	.14
Rusco, f.o.b. Nitro	lb.	.25 @	.30
Sericite, f.o.b. N. Y.	ton	65.00 @	—
Soap Tree Bark, cut, sifted	lb.	.06 @	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.23 @	—
Black	lb.	.08½ @	—
White	lb.	.095 @	.15
Brown	lb.	.095 @	.14
Neophax	lb.	.13 @	—

VULCANIZING INGREDIENTS

Sulfur Chloride, yellow (drs.)	lb.	.02½ @	.04
Sulfur flour.			
Refined, 100% pure (bags)	cwt.	2.55 @	3.65
Commercial (bags)	cwt.	1.60 @	2.35
Telloy	lb.		
Vandex	lb.		

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

	Gross Imports			Re-exports			Net Imports
YEARS	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,362	185,060,304	26.71	8,772	5,672,319	28.87	300,590
1924	325,899	173,367,272	23.75	10,309	6,057,637	26.23	315,590
1925	393,370	426,167,504	48.36	14,827	19,847,753	59.76	378,543
1926	409,944	501,131,064	54.57	17,671	22,470,583	56.77	392,273
1927	424,733	338,688,492	35.60	27,775	24,735,488	39.76	396,958
1928	432,633	242,727,423	25.05	32,159	18,128,761	25.17	400,474
1929	560,082	239,177,811	19.06	36,485	16,868,718	20.64	523,597
1930	482,083	139,133,048	12.88	30,205	9,310,205	13.76	451,878
1931	497,176	72,922,845	6.55	25,595	4,255,572	7.42	471,581
1932	409,556	31,936,459	3.48	20,930	2,015,612	4.30	388,626
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	387,280
1934	449,513	97,929,676	9.73	23,848	5,770,109	10.80	425,665
1935	453,134	115,299,448	11.36	11,389	3,084,331	12.09	441,745
1936	467,064	152,072,496	14.54	12,581	4,488,223	15.93	454,483
1935:							
Oct.	35,091	8,742,222	11.12	651	188,518	12.92	34,440
Nov.*	25,155	6,164,454	10.94	380	101,793	11.95	24,775
Dec.	38,417	9,930,710	11.54	1,821	523,997	12.85	36,596
1936:							
Jan.*	32,310	8,637,997	11.94	733	229,129	13.98	31,577
Feb.	32,879	9,293,71[illegible]	12.62	625	199,956	14.27	32,254
Mar.*	33,447	9,845,77[illegible]	13.14	1,172	390,551	14.88	32,275
Apr.*	44,218	13,967,712	14.10	984	343,785	15.59	43,234
May*	35,578	11,460,157	14.38	1,589	580,021	16.30	33,989
June	36,376	12,073,632	14.82	2,469	904,669	16.35	33,907
July	38,178	12,763,200	14.92	1,383	510,075	16.47	36,795
Aug.	40,027	13,364,916	14.91	840	307,114	16.32	39,187
Sept.*	48,368	16,691,919	15.41	656	244,554	16.64	47,712
Oct.	39,573	13,627,465	15.37	778	268,645	15.42	38,795
Nov.*	36,798	12,790,306	15.52	675	241,982	15.99	36,123
Dec.	49,312	17,555,705	15.89	677	267,745	17.65	48,635
1937:							
Jan.	42,002	15,408,242	16.38	844	372,053	19.69	41,158
Feb.	42,743	16,470,867	17.20	523	236,853	20.21	42,220
Mar.	38,682	16,030,267	18.50	1,146	522,931	20.37	37,536
Apr.	41,275	17,859,223	19.31	1,050	415,484	17.66	40,225

* Revised.

Note: Annual figures for 1922-1936 revised on basis of information received on February 8, 1937. Figures for 1922 and 1923 include latex; guayule is included only in 1922.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule		Balata		Jelutong		Liquid Latex (1)	
	Tons	Dollars	Tons	Dollars	Tons	Dollars	Tons	Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,272	3,537,510
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,394	4,686,743
1927	5,018	2,674,957	582	477,246	7,785	2,448,657	1,495	1,170,650
1928	3,077	1,755,685	731	430,855	7,552	2,540,059	4,007	2,121,786
1929	1,275	545,175	728	566,964	8,204	2,458,126	3,729	1,788,391
1930	1,006	347,388	502	422,684	5,907	1,403,244	4,458	1,508,786
1931	....	.....	1,207	411,380	5,777	1,019,010	4,675	888,909
1932	....	.....	707	147,403	4,607	616,596	5,112	601,999
1933	....	.....	1,659	2,261,869	5,990	944,895	11,085	1,833,671
1934	398	75,349	1,054	438,209	4,987	943,752	13,107	3,643,221
1935	459	86,835	615	188,384	5,644	1,063,126	13,553	3,782,222
1936	1,229	286,552	535	199,368	6,163	1,296,364	19,852	6,659,899
1936:								
June	97	18,380	33	13,671	767	186,274	1,897	657,311
July	96	18,168	44	15,314	556	106,676	1,665	579,895
Aug.	146	37,147	72	23,715	321	64,769	1,761	602,992
Sept.	106	29,335	21	9,846	418	85,624	1,800	692,810
Oct.	114	31,489	11	4,815	452	102,485	1,392	500,817
Nov.	159	43,980	43	19,408	405	91,538	1,631	578,729
Dec.	134	36,972	14	7,247	538	109,208	2,070	735,156
1937:								
Jan.	160	44,166	10	4,348	247	56,056	1,337	535,546
Feb.	206	56,807	14	5,838	242	61,741	1,973	775,202
Mar.	136	37,453	29	13,949	898	187,413	2,216	968,053
Apr.	190	52,361	3	1,457	617	135,412	1,633	724,757

(1) Weight given in pounds of dry rubber contained in latex.

Note: Annual figures for 1924-1936 revised on basis of information received on February 8, 1937.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

(All Quantities in Long Tons)

	Figures on Monthly Basis							
	1930	1931	1932	1933	1934	1935	1936*	1937
Jan.	36,194	28,557	29,648	22,645*	39,190*	46,636*	48,631	50,818*
Feb.	33,302	28,797	31,821	21,392*	40,515*	42,720*	36,841	51,887*
Mar.	35,540	32,788	29,505	17,483*	47,003*	42,153*	42,813	54,064*
Apr.	39,686	33,321	27,518	25,928	44,853*	44,247*	52,031	51,797
May	39,386	37,817	30,957	44,074	42,918*	41,101*	50,612	51,733
June	34,195	37,916	41,475	50,743*	40,147*	36,156*	52,772	.....
July	29,508	31,397	29,976	49,614*	32,553*	35,917*	48,250	.....
Aug.	30,850	27,586	23,721	44,428*	33,216*	38,775*	46,777	.....
Sept.	25,515	23,638	23,847	35,281*	30,258*	37,086*	46,449	.....
Oct.	27,516	22,277	22,286	31,543*	31,253*	41,969*	49,637	.....
Nov.	23,691	22,943	23,231	28,831*	34,748*	42,310*	50,433	.....
Dec.	21,687	21,409	18,015	28,757*	36,569*	42,474*	49,754	.....
Tot.	375,980	348,986	332,000	400,719*	453,223*	491,544*	575,000	.....

* Revised.

Note: Figures for 1936 were revised on May 15, 1937, and are now based on Department of Commerce survey figures.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks[a]	Year	Production	Consumption Tons	Consumption % to Crude	Stocks[a]
1927	189,144	178,471	47.6	24,980	1932	75,608	77,504	23.4	16,354
1928	208,516	223,000	50.4	24,785	1933	99,560	81,602	19.9	20,746
1929	218,954	226,588	48.4	27,464	1934	110,010	100,597	22.2	23,079
1930	157,967	153,497	40.8	22,006	1935	122,948	113,078*	23.0[a]	25,069
1931	133,351	124,126	33.9	19,257	1936	150,571	130,048	22.7	30,573

	Figures on Monthly Basis								
1936*:									
Jan.	11,665	10,922	22.5	17,171	July	12,330	12,856	26.6	16,207
Feb.	10,188	8,014	21.8	18,890	Aug.	12,856	11,959	25.6	16,487
Mar.	10,712	9,539	22.3	19,472	Sept.	12,959	12,153	26.2	16,711
Apr.	11,382	11,241	21.6	19,024	Oct.	14,737	13,715	27.6	17,141
May	11,512	11,311	22.3	18,590	Nov.	14,357	13,087	25.9	17,900
June	11,935	12,563	23.8	17,366	Dec.	15,938	14,126	28.4	19,000
1937:									
Jan.*	15,129	14,450	28.4	18,822	July	.....	.....	...	.....
Feb.*	15,192	14,578	28.1	18,490	Aug.	.....	.....	...	.....
Mar.*	14,462	15,601	28.9	16,450	Sept.	.....	.....	...	.....
Apr.	13,884	15,607	30.1	14,046	Oct.	.....	.....	...	.....
May	15,793	14,693	28.4	14,647	Nov.	.....	.....	...	.....
June	.....	.....	...	.....	Dec.	.....	.....	...	.....

[a] Stocks on hand at the end of month or year.

* Revised.

Note: Figures for 1936 were revised on June 1, 1937, and are now based on Department of Commerce survey figures.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)

(In Thousands of Barrels of 42 Gallons)

	1935	1936	1937		1935	1936	1937
January	28,147*	32,412*	33,696	August	43,097*	46,081	.....
February	26,580*	27,216*	32,000	September	37,976*	44,346	.....
March	32,272*	35,871	40,561	October	41,566*	44,253	.....
April	36,363*	38,825	43,409	November	35,991*	39,919	.....
May	39,381*	42,007	.....	December	33,872*	39,393	.....
June	38,086*	44,630	.....				
July	41,479*	46,638*	.....	Total	434,810*	481,591	.....

* Revised.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1925	26,001,664	1929	24,141,502	1933	8,713,962
1926	24,199,524	1930	17,364,096	1934	12,255,118
1927	19,700,003	1931	11,253,800	1935	18,664,356
1928	24,247,282	1932	6,261,336	1936	20,790,098

1937:		1937:		1937:	
January ...	2,123,723	May	2,189,502	September ..	.....
February ..	2,022,258	June	2,141,810	October ...	.....
March	2,166,218	July	.....	November ..	.....
April	2,269,680	August	.....	December ..	.....

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market. in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1935																																
March	12⅝	12⅝	—	12⅝	12⅝	12	12⅝	12⅝	12	—	11¾	11¾	11⅞	11½	11	11⅞	—	10⅝	10⅛	11⅛	10⅝	—	10⅛	10⅝	—	10½	11⅛	11⅛	11½	—	—	11⅛
April	11⅜	11⅛	11¼	11⅛	11	11	11⅛	10⅛	11⅜	11½	11⅜	11½	11⅛	11⅛	11	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	—	11⅛
May	11⅛	11½	11⅝	11½	11⅝	11⅝	11⅝	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	12⅛	11½
June	12⅛	12⅛	12⅛	12½	12½	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12½	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	—	12⅝
July	12⅛	12⅛	12¼	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12¾	12⅛
August	12⅛	12⅛	—	—	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	—	12⅝
September	—	—	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	—	11⅛
October	11⅛	11⅛	11⅛	12	12	12	11⅞	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛
November	13¼	13⅛	12⅝	13⅛	13	13¼	13⅛	13⅛	13	13	13⅛	13	13⅛	13⅛	13⅛	13⅛	13⅛	13	13	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛
December	—	—	12⅝	12⅝	13	13⅛	13⅛	13⅛	13	12⅛	13	13	13	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛
1936																																
January	—	13½	13⅝	13⅝	—	13⅝	13⅛	13⅛	13⅞	—	—	—	—	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞
February	15⅛	15⅜	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛
March	15⅛	15⅜	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛
April	15⅛	15⅜	15⅛	15⅛	15⅜	15⅜	15⅜	15⅛	15⅛	16	16	15⅛	15⅛	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15⅝	16
May	15⅛	15⅜	15⅛	15⅛	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
June	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
July	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
Aug.	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
Sept.	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
Oct.	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
Nov.	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
Dec.	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
1937																																
Jan.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Feb.	21	21	21⅛	20⅞	20⅜	21⅜	21⅜	21⅜	22⅛	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜
Mar.	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛
April	21⅛	21⅛	21⅛	21⅛	22⅛	22⅛	24⅛	24⅛	24⅛	23⅝	23⅝	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞
May	21⅛	21⅛	21⅛	21⅛	22⅛	22⅛	24⅛	24⅛	24⅛	23⅝	23⅝	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞
June	21	20⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞
July	20⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1929

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15	1922	17.50	1926	48.50
1911	141.30	1915	65.85	1919	48.70	1923	29.45	1927	37.72
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.55

Average Monthly Price per Pound Since 1930

	1930 Cents	1931 Cents	1932 Cents	1933 Cents	1934 Cents	1935 Cents	1936 Cents	1937 Cents
Jan.	15.24	8.34	4.38	3.08	9.32	13.10	14.35	21.37
Feb.	15.85	7.70	4.03	2.95	10.45	12.92	15.48	21.33
Mar.	15.34	7.71	3.35	3.01	11.01	11.51	15.89	24.09
Apr.	14.93	6.43	3.02	3.56	12.10	11.55	15.98	23.44
May	14.24	6.49	3.09	4.95	13.26	12.05	15.62	21.14
June	12.45	6.35	2.66	6.15	13.51	12.57	15.85	19.29
July	11.24	6.37	2.89	8.01	14.60	12.10	16.49	
Aug.	9.96	5.38	3.63	7.31	15.47	11.98	16.25	
Sept.	8.28	5.08	3.84	7.30	15.36	11.55	16.46	
Oct.	8.20	4.87	3.65	7.64	13.96	12.62	16.55	
Nov.	9.01	4.65	3.44	8.66	13.04	13.15	17.97	
Dec.	9.05	4.64	3.24	8.87	12.98	13.28	20.01	
Average for Year	11.98	6.17	3.49	5.96	12.92	12.37	16.41	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	1937 Apr.	1937 May	1937 June	1937 July
1	13 3/8	10 1/8	9 1/8	9 3/8
2	13	—	10	9 1/8
3	13 1/16	10 1/8	9 1/8	—
4	—	10 1/8	9 3/8	—
5	12 15/16	10 3/8	—	9 7/16
6	12 5/8	10 3/8	—	9 1/2
7	12 1/8	10 3/4	9 3/4	9 3/8
8	12 1/8	10 1/8	9 3/8	9 7/16
9	11 15/16	—	9 1/8	—
10	12 1/16	10 3/8	9 1/8	—
11	—	10 3/8	9 1/16	—
12	11 1/2	—	—	—
13	11 7/8	10 1/4	—	—
14	11 7/8	—	9 1/8	—
15	10 15/16	—	9 3/8	—
16	10 7/8	—	9 1/2	—

Day	1937 Apr.	1937 May	1937 June	1937 July
17	10 7/8	—	9 1/2	
18	—	10	9 1/16	
19	11 1/8	10 1/4	—	
20	11 1/16	10 1/8	—	
21	11 1/4	10 1/4	9 5/8	
22	11 3/8	10 1/4	9 1/8	
23	11 1/8	—	9 1/2	
24	11 1/4	10 1/8	9 3/4	
25	—	10 1/16	9 7/8	
26	10 15/16	10 1/16	—	
27	10 3/4	10	—	
28	10 3/8	10	9 7/8	
29	10	10	9 1/2	
30	10	—	9 1/2	
31	—	9 15/16	—	

Average Monthly Price Per Pound

Month	1934 Pence	1935 Pence	1936 Pence	1937 Pence
Jan.	4.429	6.434	6.758	10.378
Feb.	4.920	6.292	7.255	10.503
Mar.	5.136	5.745	7.450	11.766
Apr.	5.712	5.604	7.502	11.471
May	6.207	5.822	7.335	10.250
June	6.245	6.027	7.352	9.548
July	7.053	5.801	7.696	

Month	1934 Pence	1935 Pence	1936 Pence	1937 Pence
Aug.	7.401	5.696	7.581	
Sept.	7.409	5.508	7.577	
Oct.	6.806	6.130	7.898	
Nov.	6.294	6.308	8.572	
Dec.	6.295	6.340	9.580	
Average for Year	6.159	5.976	7.713	

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	1937 May	1937 June	1937 July
1	13.41	13.22	12.62
2	—	13.25	12.51
3	13.50	13.19	12.49
4	13.55	13.20	—
5	13.65	13.24	—
6	13.62	—	12.56
7	13.58	12.79	12.62
8	13.58	12.69	12.85
9	—	12.49	
10	13.40	12.59	

Date	1937 May	1937 June	1937 July
11	13.26	12.61	
12	13.31	12.48	
13	13.12	—	
14	13.18	12.36	
15	13.26	12.39	
16	—	12.43	
17	13.16	12.51	
18	13.27	12.56	
19	13.27	12.44	
20	13.36	—	
21	13.25	12.55	

Date	1937 May	1937 June	1937 July
22	13.34	12.55	
23	—	12.71	
24	13.30	12.61	
25	13.16	12.74	
26	13.16	12.76	
27	13.27	—	
28	13.30	12.70	
29	—	12.66	
30	—	12.54	
31	—	—	

Average Monthly Price Per Pound

	1934 Cents	1935 Cents	1936 Cents	1937 Cents
Jan.	11.25	12.70	11.91	13.06
Feb.	12.28	12.58	11.53	13.15
Mar.	12.30	11.63	11.43	14.46
Apr.	11.80	11.73	11.71	14.23
May	11.44	12.25	11.68	13.34
June	12.20	11.89	12.02	12.70
July	12.84	12.26	13.11	

	1934 Cents	1935 Cents	1936 Cents	1937 Cents
Aug.	13.40	11.48	12.28	
Sept.	13.00	10.80	12.31	
Oct.	12.48	11.28	12.30	
Nov.	12.53	12.01	12.23	
Dec.	12.76	11.99	12.83	
Average for Year	12.36	11.88	12.11	

World Stocks of Crude Rubber

(All figures are in long tons)

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND 1935	ON HAND 1936	ON HAND 1937	AFLOAT 1935	AFLOAT 1936	AFLOAT 1937	ON HAND AND AFLOAT 1935	ON HAND AND AFLOAT 1936	ON HAND AND AFLOAT 1937
Jan.	349,446	285,054*	201,915	42,066	43,870	55,096	391,512	328,924*	257,011
Feb.	340,264	282,902*	193,864	42,969	46,532	53,538	383,233	329,434*	247,402
Mar.	340,284	276,823*	191,928*	44,485	58,935	56,994	384,769	335,758*	248,922*
Apr.	337,586	277,478*	174,934	37,651	47,678	72,530	375,237	325,156*	247,464
May	322,558	262,415*	172,985	44,375	48,860	58,542	366,933	311,275*	231,527
June	324,218	245,886		55,581	47,228		379,799	293,114	
July	334,692	234,498		49,018	60,343		383,710	294,841	
Aug.	334,106	229,056		47,724	63,597		381,830	292,653	
Sept.	331,121	228,477		43,413	62,240		374,534	290,717	
Oct.	322,857	219,553		49,913	67,825		371,770	287,378	
Nov.	308,993	212,515		46,588	73,691		355,581	286,206	
Dec.	303,000	218,844		39,094	56,567		342,094	275,411	

(Rubber Manufacturers' Association figures raised to 100%)

* Revised.

Note: Complete figures for 1934 and 1935 were revised by the R.M.A. on May 1, 1936.

STOCKS IN GREAT BRITAIN

(No. of Tons in Wharves and Warehouses, not including Latex)

At end of	London 1935	London 1936	London 1937	Liverpool 1935	Liverpool 1936	Liverpool 1937
January	81,807	84,791	29,005	66,405	77,188	41,895
February	87,605	79,757	26,508	67,983	77,138	37,078
March	92,664	74,779	21,292	69,218	72,823	30,622
April	94,361	68,932	21,128	70,584	71,388	27,443
May	95,722	61,349	21,351	71,927	69,150	25,081
June	98,077	55,993		73,131	66,173	
July	99,226	49,575		74,915	63,715	
August	101,574	45,749		75,584	62,367	
September	101,198	44,364		76,263	59,485	
October	94,749	40,777		76,400	55,738	
November	90,542	37,495		76,301	51,184	
December	86,551	33,027		77,589	45,291	

(Figures from the Rubber Trade Association of London)

STOCKS IN OTHER CENTRES

(Figures from Statistical Bulletin of the Int'l Rubber Regulation Committee)

	Penang and Singapore [1]	Malaya [2]	Ceylon [3]	Holland	Para and Manaos
At end of 1936					
June	28,260	34,166	3,057	1,070	4,502
July	29,443	34,395	3,610	1,026	4,696
August	28,289	34,849	3,961	979	1,742*
September	26,936	33,351	3,930	911	1,817
October	24,593	34,941	3,490	773	1,820
November	26,761	33,469	3,415	588	1,948
December	26,969	35,145	5,161	409	2,454
At end of 1937					
January	36,365	41,911	5,024	290	4,005
February	42,132	44,346	5,855	197	3,763
March	42,485	40,317	3,477	108	4,078
April	38,812		3,745		3,840

[1] Dealers' and Port Stocks. [2] Inside Regulated Areas. [3] Dealers' Stocks Only.
* Revised.

RUBBER STOCKS AFLOAT

End of: 1936:	Afloat for United States	Afloat for Europe	All Other * Afloat	Total * Afloat
May	48,860	18,670	21,470	89,000
June	47,228	20,200	22,572	90,000
July	60,343	20,300	25,357	106,000
August	63,597	19,800	15,603	99,000
September	62,240	18,090	15,670	96,000
October	67,825	20,790	17,385	106,000
November	73,691	19,270	13,039	106,000
December	56,567	24,800	21,633	103,000
End of: 1937				
January	55,096	24,920	17,984	98,000
February	53,538	27,250	13,212	94,000
March	56,994	31,240	36,766	125,000
April	72,530	32,000	19,470	124,000
May	58,542	32,000	25,548	116,000

* *Total Afloat* is an arbitrary estimate based on 1½ months' shipments as adopted by the Department of Commerce. *All Other Afloat* is determined by subtracting the amount of stocks in transit to the United States and Europe from the estimated total.
P—Preliminary estimate.

TOTAL WORLD STOCKS

(Figures from the Survey of Current Business)

At end of	1932	1933	1934	1935	1936*	1937
January	623,416*	634,797	661,948	698,153	600,479	454,249*
February	611,819*	626,227	663,308	686,195	599,355	445,265*
March	614,894*	638,428	666,382	678,809	583,318	447,856*
April	615,893*	629,159	658,796	677,006	567,172	422,000
May	612,474*	626,537	689,239	677,569	541,871	.....
June	595,712	613,055	672,804	671,525	520,255	.....
July	589,037	618,258	676,200	679,061	519,074	.....
August	597,274	617,449	674,702	680,644	500,520	.....
September	599,986	623,683	694,361	661,509	493,585	.....
October	609,368	636,597	680,616	655,000	486,159	.....
November	614,342	642,968	684,408	617,300*	466,491	.....
December	629,898	654,890	705,975	613,987*	466,576	.....
Monthly Avge.	609,502*	630,171	677,395	666,397*	528,738	.....

* Revised.

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1929	1930	1931	1932	1933	1934	1935	1936
Production	68,726	50,965	48,740	40,085	45,303	47,233	49,362	58,116
Shipments	69,395	53,638	50,061	40,251	44,094	46,687	50,183	55,363
Inventory [2]	11,838	9,003	7,775	7,644	8,888	9,455	8,196	11,114

Figures for Recent Months

	PRODUCTION 1935	PRODUCTION 1936*	PRODUCTION 1937	SHIPMENTS 1935	SHIPMENTS 1936*	SHIPMENTS 1937	INVENTORY 1935	INVENTORY 1936*	INVENTORY 1937
Jan.	4,626	4,579	4,980	3,663	3,875	4,509	10,398	8,917	11,377
Feb.	4,383	3,579	5,246	3,287	3,212	4,371	11,530	9,265	12,309
Mar.	4,346	3,640	5,916	4,204	3,857	5,787	11,675	9,087	12,448
Apr.	4,512	4,857	5,730	5,144	4,904	5,560	11,003	9,035	12,629
May	4,175	4,974		4,067	5,833		11,131	8,178	
June	3,910	5,612		4,262	5,793		10,755	7,835	
July	3,532	5,466		5,447	5,744		8,850	7,750	
Aug.	3,993	5,017		4,739	4,977		7,805	7,799	
Sept.	3,787	4,984		3,303	3,837		8,288	9,012	
Oct.	4,051	5,126		4,055	4,082		8,291	10,096	
Nov.	3,997	4,972		3,930	4,233		8,249	10,823	
Dec.	4,051	5,311		4,081	5,016		8,196	11,114	

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1929	1930	1931	1932	1933	1934	1935	1936
Production	68,829	52,420	48,333	36,891	42,556	46,228	47,879	57,607
Shipments	70,592	54,938	50,021	37,911	41,391	45,046	48,067	54,626
Inventory [2]	12,807	9,999	7,922	6,749	7,815	9,180	8,231	10,985

Figures for Recent Months

	PRODUCTION 1935	PRODUCTION 1936	PRODUCTION 1937	SHIPMENTS 1935	SHIPMENTS 1936	SHIPMENTS 1937	INVENTORY 1935	INVENTORY 1936	INVENTORY 1937
Jan.	4,259	4,592	4,801	3,722	4,168	4,391	9,621	8,623	11,100
Feb.	4,171	3,556	5,091	3,362	3,446	4,536	10,466	8,699	11,734
Mar.	4,123	3,787	5,823	4,168	3,796	5,570	10,406	8,692	11,904
Apr.	4,259	4,824	5,627	4,453	4,746	5,325	10,170	8,788	12,218
May	3,892	4,819		3,451	4,919		10,615	8,719	
June	3,480	5,035		4,024	5,504		10,050	8,105	
July	3,251	5,177		5,269	5,758		8,005	7,725	
Aug.	3,894	5,039		4,556	5,136		6,939	7,621	
Sept.	4,125	5,161		3,426	4,231		7,565	8,627	
Oct.	4,435	5,397		3,987	4,108		8,053	9,977	
Nov.	3,942	4,739		3,687	3,995		8,161	10,732	
Dec.	4,048	5,121		3,962	4,819		8,231	10,985	

(1) These figures have been adjusted to represent 100% of the industry based on reports received by the Rubber Manufacturers' Association which represent 80% for 1931-1932-1933; 97% for 1934-1935; 81% for 1936. All figures through September, 1936, were revised in December, 1936. Annual figures are more accurate.
(2) Held by manufacturers at end of period indicated.
(*) Revised.

Automobile Production

	United States Total	United States Passenger Cars	United States Trucks	Canada Total	Canada Passenger Cars	Canada Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,124
1934*	2,753,111	2,177,919	575,192	116,852	92,647	24,205	2,869,963
1935*	3,946,934	3,252,244	694,690	172,877	135,562	37,315	4,119,811
1936*	4,454,115	3,669,528	784,587	162,322	131,308	31,014	4,616,437
1936							
July*	440,731	371,922	68,809	10,475	8,192	2,833	451,206
Aug.*	271,274	209,351	61,923	4,660	3,051	1,609	275,934
Sept.*	135,165	90,101	45,064	4,655	2,481	2,174	139,820
Oct.*	224,688	190,242	34,446	5,361	4,592	769	230,049
Nov.*	394,987	341,085	53,902	10,812	10,086	726	405,799
Dec.*	498,710	425,365	73,345	20,411	16,542	3,869	519,121
1937							
Jan.*	380,051	309,637	70,414	19,583	15,009	4,574	399,634
Feb.*	363,991	296,636	67,355	19,707	14,415	5,292	383,698
Mar.*	494,276	403,879	90,397	24,701	19,313	5,388	518,977
Apr.	536,334	439,980	96,354	17,081	12,927	4,154	553,415
May	516,899	425,432	91,467	23,458	17,980	5,478	540,357

* Revised.
Note: U. S. figures represent factory sales; Canadian figures represent production.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA [1]								DUTCH EAST INDIES [1]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon [2]	India & Burma [3]	Sarawak [4]	British North Borneo [3]	Siam [4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China [3]	Amazon Valley	All Other [4]	World Total [5]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,562	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,312
1934	677,361	211,803	465,558	79,746	10,492	17,233	11,103	17,545	87,400	112,058	175,470	20,170	8,903	2,985	1,008,663
1935	590,319	174,652	415,667	54,316	13,968	19,465	8,885	28,327	57,488	78,325	139,297	28,816	11,275	8,745	864,574
1936	520,286	167,799	352,487	49,692	14,724	21,243	8,177	33,702	61,307	84,577	152,205	40,782	14,193	11,466	845,431
1935:															
Sept.	51,247	10,365	40,882	4,053	710	1,758	421	1,949	4,089	5,862	9,637	2,601	1,121	669	73,752
Oct.	48,258	19,364	28,894	5,932	1,284	1,684	1,040	2,679	3,937	6,711	16,818	2,260	1,292	714	73,245
Nov.	43,147	10,518	32,629	4,288	2,273	1,141	455	2,303	3,724	3,818	8,863	2,445	907	876	63,722
Dec.	37,838	7,529	30,309	4,942	3,028	1,233	171	3,079	3,881	5,206	5,854	4,532	1,352	1,122	62,709
1936:															
Jan.	39,101	12,582	26,519	4,178	1,299	2,317	938	1,665	4,315	6,347	9,381	2,449	1,606	839	61,853
Feb.	38,436	18,857	19,579	3,664	1,382	2,107	529	3,663	4,789	6,643	15,851	2,892	1,201	1,051	63,353
Mar.	46,552	12,026	34,526	4,336	1,324	1,848	342	2,966	4,484	5,052	9,225	2,553	1,264	751	68,671
Apr.	36,251	14,702	21,549	3,172	1,230	2,053	869	1,596	4,895	6,446	13,032	2,416	1,056	947	59,261
May	46,568	12,527	34,041	2,560	1,117	2,354	517	2,077	4,258	6,015	10,766	2,281	956	776	67,718
June	40,049	15,026	25,023	3,766	1,226	1,386	461	3,737	4,577	6,519	14,588	2,733	917	823	65,756
July	53,114	19,038	34,076	3,773	1,359	1,399	1,035	3,734	6,133	8,578	17,946	2,738	964	933	82,668
Aug.	43,506	13,361	30,145	3,940	776	2,541	656	3,284	4,978	7,353	12,106	3,017	542	1,054	70,392
Sept.	44,110	10,039	34,071	5,367	664	1,139	537	3,259	4,531	6,241	10,175	3,505	1,119	937	71,545
Oct.	46,543	12,960	33,583	5,599	1,181	2,143	1,086	3,349	6,477	8,145	12,881	3,874	1,255	1,105	80,678
Nov.	47,342	16,923	30,419	4,960	1,322	1,950	701	2,260	5,398	7,109	16,718	3,872	1,592	1,163	77,464
Dec.	38,714	9,758	28,956	4,377	1,844		506	2,988	6,472	10,129	9,536	8,450	1,721	1,087	76,072
1937:															
Jan.	41,571	16,956	24,615	4,541	1,077	4,063	1,234	3,849	5,136	8,011	13,102	2,828	1,271	1,000*	70,727
Feb.	38,058	14,048	24,010	5,619	1,831	2,043	790	3,554	5,484	7,656	12,414	3,074	1,692	1,000*	69,167
Mar.	59,568	19,579	39,989	7,066	2,040	1,425	1,239	3,873	7,791	11,848	19,969	3,173	1,749	1,000*	101,162
Apr.	58,718	17,136	41,582	3,423	1,203	2,960	783	1,899	6,999	8,967	15,989	2,094	1,522	1,000*	88,421
May	51,152	17,350	33,802	4,612	1,012	742	778	2,238	7,530	8,981	21,085	2,837	1,500*	1,000*	86,107
June	54,809	23,614	31,195	5,153											

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons in 1924, 6 tons in 1925, 20 tons in 1926, about ¼ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons in 1924, 2,239 tons in 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. * Figure is provisional; final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(*Long Tons*)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,80[illegible]
1920	249,530	56,844	13,883	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,273	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934	439,172	158,482	49,560	59,330	28,439	69,905	21,398	47,271	9,642	9,115	3,758	12,418	6,900	10,999	926,389
1935	455,758	128,829	51,450	62,899	26,870	57,567	21,880	37,572	9,978	7,593	4,068	11,878	8,140	11,245	895,727
1936	475,359	—2,591	57,032	71,794	27,871	61,223	17,000*	30,967	14,109	9,648	2,888	11,236	6,668	8,772	791,976
1936:															
Feb.	33,789	1,271	6,264	5,257	1,900	2,786	1,000*	94	735	799	106	497	1,312	344	56,154
Mar.	33,743	—1,227	4,333	4,569	1,811	5,170	1,000*	4,376	819	1,033	339	754	1,113	410	58,243
April	44,948	2,097	4,250	5,497	1,079	4,929	1,500*	3,251	919	1,097	238	848	679	603	71,935
May	35,549	302	4,335	4,639	2,221	5,531	1,000*	4,220	1,034	698	103	657	500*	667	61 456
June	35,901	—1,493	4,846	5,698	2,042	4,567	1,500*	2,427	1,635	579	—27	650	500*	323	59,148
July	38,556	—766	4,621	6,837	2,274	5,126	2,000*	1,733	1,363	713	183	1,094	500*	495	64,729
Aug.	41,094	—1,581	4,513	6,556	3,781	4,305	1,500*	3,128	807	789	42	1,145	500*	989	67,440
Sept.	49,483	—12	4,393	6,006	2,393	5,195	1,500*	2,922	2,297	514	471	1,090	300*	624	77,176
Oct.	40,301	—87	4,752	7,232	3,110	6,600	1,500*	2,761	1,092	817	343	1,171	200*	1,026	70,818
Nov.	37,897	—742	3,282	6,500	4,308	3,961	1,500*	2,162	964	1,090	445	1,388	200*	823	63,778
Dec.	50,838	—4,926	4,688	7,458	1,193	8,698	1,500*	3,426	1,184	759	276	1,206	200*	1,701	78,201
1937:															
Jan.	42,655	33	4,430	7,041	1,632	8,357	1,700	2,633	582	854	269	1,115	200*	567	72,368
Feb.	44,398	—222	5,296	7,911	1,271	6,630	1,502	3,048	304	1,363	245	452	200*	837	73,233
Mar.	39,888	343	5,347	7,668	2,612	6,935	2,119	3,598	1,293	1,641	371	709	200*	601	72,727
Apr.	42,066	3,808	5,291	8,664	1,343	5,837	1,669	1,532	1,058	1,669	362	1,070	200*	1,445	80,414
May		6,100	5,558	6,706		8,596			1,290		361				

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1] United States imports of guayule are included in this compilation. * Figure is provisional; final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

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